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50448

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# Module 1: Introduction to Waste

Waste Management Fundamentals  
for Environmental Professionals

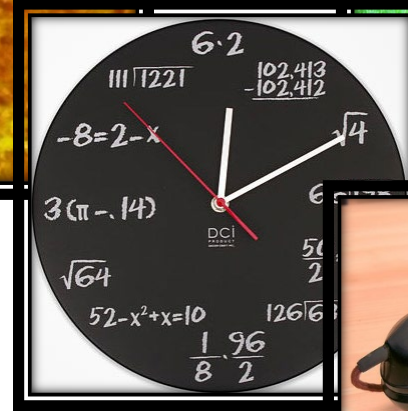
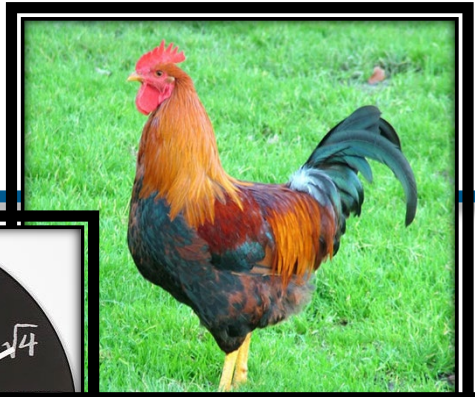
UTrain: 50448

Revision 0; Aug. 2021



# Getting Started

- **Safety**
- **Roster**  
(for each module)
- **Time Required**
- **Breaks**
- **Phones**
- **Exam**  
(for each module)



# This Course

- At the pilot we discovered that we need to focus on how we do waste management **at LANL**
- Environmental Professionals have a **variety of jobs** – most impact waste in some way
- Finding a **balance** between comprehensive enough and too much
- Goals of this training are **good, consistent, and helpful**; not just a requirement
- Information is **repeated** – it can't be helped, and it's good for review
- If you have information/experience to contribute, **please do so!**



## "This course is awesome"

Various People on *Waste Management Fundamentals for Environmental Professionals*  
This course is awesome. Every module had clear explanations and was easy to understand. Thank you very much.  
on Jun 23 [Show context](#) [Reply](#)

★★★★★

**No: P409**

Revision: 8

Issued: 02/18/21

Effective Date: 04/30/21

## LANL Waste Management

### 1.0 PURPOSE

This document describes the Triad National Security, LLC (Triad) waste management process at Los Alamos National Laboratory (LANL or the Laboratory). Specifically, this policy document describes the Laboratory's system for safely and compliantly characterizing, packaging, storing, treating, disposing, and transporting the various sanitary, hazardous, radioactive, and otherwise regulated wastes generated by LANL activities. This process includes the proper management of contaminated environmental media (e.g., excavated soil) and recyclable materials.

The Laboratory's waste management process has the following goals:

- To systematically plan, document, execute, and manage the Laboratory's various wastes;
- To manage waste from "cradle to grave" (generation to disposal);

# The Modules

YOU  
are  
HERE

- 1: Intro to Waste
- 2: Waste Regulations and Requirements
- 3: Waste Planning
- 4: Waste Generation and Tracking
- 5: Waste Characterization
- 6: Waste Packaging
- 7: Waste Accumulation and Storage
- 8: Waste Treatment
- 9: Waste Shipping
- 10: Operating Experience and Lessons Learned

## Day 1:

- 1) **Intro** (8-10)
- 2) **Regs/Reqs** (10:30 -lunch- 2:00)
- 3) **Planning** (2:30 - 5)

## Day 2:

- 4) **Generation/Tracking** (8 - 10)
- 5) **Characterization** (10:30 -lunch- 5)

## Day 3:

- 6) **Packaging** (8-9)
- 7) **Accum/Storage** (9:30 -lunch- 5)

## Day 4:

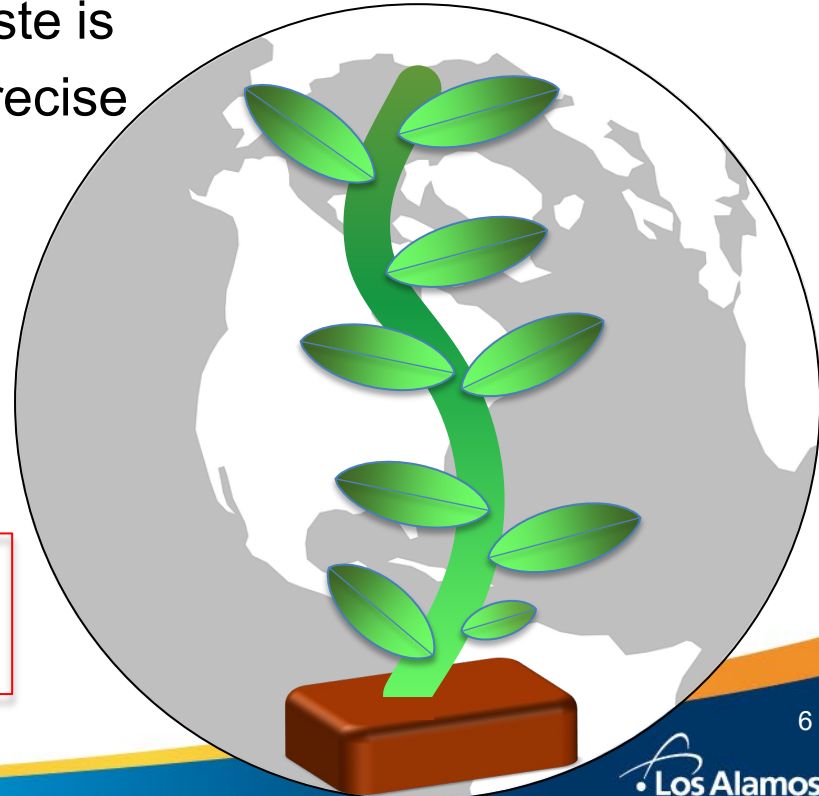
- 8) **Treatment** (8-10)
- 9) **Shipping** (10:30–12) lunch
- 10) **Lessons Learned** (1-3)

# The World of Waste:

## *It's probably more complex than you thought*

- We all have a general sense of what waste is
- However; important to be specific and precise
  - Regulators and regulations
  - What rules apply and when?
  - Where and how do they apply?
- LOTS of different people associated with the waste industry

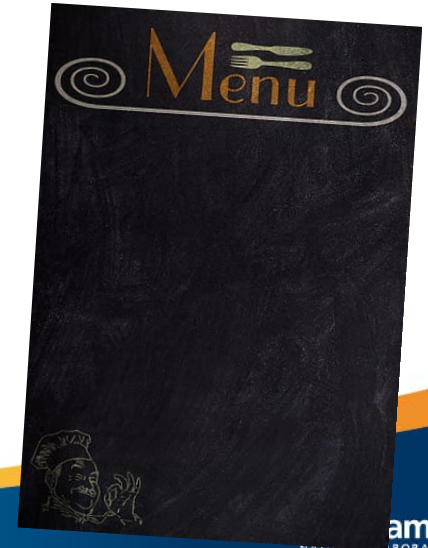
*This overview is designed to give an appreciation for the world of waste*





# Topics

- Waste
  - What is waste?
  - Waste Management in the U.S.
  - RCRA and other waste requirements
  - Where waste comes from
  - Hazardous waste
  - Waste activity oversight
  - When do requirements apply?
  - Tracking waste
  - Signs, labels, and markings
  - Waste containers
- Waste Management Organization
- People Involved
- LANL Waste-Related Programs



# Enabling Objectives



- List fundamental attributes of waste
- Recognize regulatory agencies and significant regulations involved in U.S. waste management
- List the three broad origins of waste
- List the agencies that oversee waste management activities at LANL
- Describe how waste and waste-related activities are tracked across LANL
- Recognize the importance of signs, labels, and markings related to waste
- Recognize the importance of various aspects of waste containers
- Identify organizations and personnel associated with waste activities at LANL
- Identify LANL policies and programs that apply to waste



# Big Picture Overview

## Waste

- What is “waste”?



# Waste Management in the U.S.

- **Atomic Energy Act (AEA) of 1954**
  - Federal law that covers the development, regulation, and disposal of nuclear materials and facilities
- The **Solid Waste Disposal Act (SWDA)** is an Act of Congress passed in **1965**
  - Described as *"the first federal effort to improve waste disposal technology"*
- The **U.S. Environmental Protection Agency (EPA)** is an independent executive agency of the United States federal government that was established in **1970** for environmental protection
  - President Richard Nixon signed an executive order establishing the EPA
  - It was ratified by the House and Senate and began operation **Dec. 1970**
  - The agency is led by an administrator who is appointed by the president and approved by Congress
  - The current administrator is \_\_\_\_\_

# Waste Management in the U.S.

*RCRA is our nation's primary law governing the disposal of solid and hazardous waste.*

- Atomic Energy Act (AEA) of **1954**
- The **Solid Waste Disposal Act (SWDA)** is an Act of Congress passed in **1965**
- The **U.S. Environmental Protection Agency (EPA)** is an independent executive agency of the United States federal government that was established in **1970** for environmental protection
- The **Resource Conservation and Recovery Act (RCRA)** was passed by congress in **Oct. 1976** as an amendment to **Solid Waste Disposal Act** of 1965
  - Congress passed to address the increasing problems the nation faced from our growing volume of municipal and industrial waste.

# Waste – according to RCRA

*“Solid waste” can be a solid, liquid, contained gas, or sludge*

- RCRA states that "**solid waste**" means any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, resulting from industrial, commercial, mining, and agricultural operations, and from community activities.
  - Nearly everything we do leaves behind some kind of waste.
- **Two common types:**
  - **Municipal Solid Waste** – “everyday” waste from homes, offices, schools
  - **Industrial Waste** – variety of materials resulting from the production of goods and products (construction, demolition, special waste, medical waste, etc.)

# In Addition to RCRA...

*RCRA is our nation's primary law governing the disposal of solid and hazardous waste. But, there is more than just RCRA*

- **Toxic Substances Control Act (TSCA or TOSCA)**
  - regulates the introduction of new/existing chemicals (E.g., asbestos and PCBs)
  - passed by Congress in **1976** and administered by the EPA
- **Clean Water Act (CWA)**
  - Regulates the discharge of pollutants into the nation's surface waters, including lakes, rivers, streams, wetlands, and coastal areas.
  - Passed in **1972** and administered by the EPA
- **Hazardous Materials Transportation Act (HMTA)**
  - Federal law regulating the transportation of hazardous materials/waste
  - Enacted in **1975** and under the authority of the Department of Transportation (DOT)
- **New Mexico Special Waste (NMSW)**
  - Managed by the New Mexico Environment Department (NMED)



# LANL's Hazardous Waste Permit



*New Mexico  
Environment Department*

## *Hazardous Waste Bureau*

**LANL**

**Los Alamos National Laboratory (LANL)  
Permit and Permit Modification Information**

The State of New Mexico's authority to regulate the storage and treatment of hazardous waste at Los Alamos National Laboratory (LANL) for the protection of human health and the environment is governed under the New Mexico Hazardous Waste Act (HWA) and the Resource Conservation and Recovery Act (RCRA). Under RCRA, State programs are authorized to operate in lieu of the Environmental Protection Agency (EPA). New Mexico is authorized by EPA to issue and enforce RCRA hazardous waste facility permits under 50 Fed Reg 1515 (January 11, 1985). New Mexico implements this authority under the HWA, NMSA 1978, §74-4-1 et seq (Repl. Pamp. 2000).

# Where does waste come from?

- **We purchase it**
  - It becomes a discarded chemical product if unused
- **We make it**
  - Manufacturing
  - Research
- **We discover it**
  - Legacy materials
  - Abandoned



While most hazardous wastes that are ignitable, reactive, corrosive, or toxic are regulated by RCRA, **Congress developed an exclusion for household waste.**

Of course, that exclusion doesn't apply to LANL

# Some Waste is Hazardous Waste

- **Hazardous Waste** is **solid waste** that is dangerous or potentially harmful to our health or the environment.
  - “**Solid waste**” can be liquids, solids, gases, or sludges.
  - They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of a manufacturing processes.
- **Categories:**
  - **Listed waste** – some specific wastes are determined to be hazardous by the EPA and published in lists. (**P**, **U**, **F**, and **K**)
  - **Characteristic waste** – wastes not specifically listed but exhibits one of four hazardous characteristics:
    - **Ignitability** / **Corrosivity** / **Reactivity** / **Toxicity**
  - **Universal waste** – specific, federally **designated wastes**





# Waste Activity Oversight

- Alphabet soup of agencies and regulations:
  - **Federal**
    - Nuclear Regulatory Commission (NRC) (10 CFR)
    - Environmental Protection Agency (EPA) (40 CFR)
    - Department of Transportation (DOT) (49 CFR)
    - Department of Energy (DOE) (Orders)
  - **State**
    - New Mexico Environment Department (NMED)
  - **Local**
    - Tribal Concerns / Regulations
  - **LANL**
    - Policies / Programs / Procedures





# 40 Code of Federal Regulations (40 CFR)

- **Solid Waste Disposal Act 1965**
  - Primarily directed for management of municipal solid wastes in landfills
- **Environmental Protection Agency (EPA) Established (1970)**
- **Resource Conservation and Recovery Act (RCRA) 1976**
  - Amendments to the Solid Waste Disposal Act
  - Established the statutory requirements that are the basis of the hazardous waste regulations
- **Hazardous and Solid Waste Amendments of 1984 (HSWA)**
  - Changes in RCRA, a lot were associated with land disposal restrictions program
- **Federal Facility Compliance Act of 1992**
  - Ensure federal facilities are treated the same as private parties regarding RCRA
- **Land Disposal Program Flexibility Act of 1996**
  - Limits applicability of land disposal standards when certain hazardous wastes are managed in Clean Water Act or Safe Drinking Water Act facilities

# 40 CFR (Continued)



- Solid Waste Disposal Act 1965
  - Primarily directed for management of
- Resource Conservation and Development Act 1976
  - Established the statutory requirements for the management of land disposal of hazardous and solid waste
- Hazardous and Solid Waste Act 1976
  - Change in the management of hazardous waste

## 40 CFR Parts 260-279

DOE Orders:  
435.1 Radioactive Waste Management  
422.1 Conduct of Operations  
414.1D Quality Assurance  
[www.directives.doe.gov](http://www.directives.doe.gov)

[www.ecfr.gov](http://www.ecfr.gov)

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### Electronic Code of Federal Regulations

e-CFR data is current as of **March 12, 2020**

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**Browse:** Select a title from the list below, then press "Go".

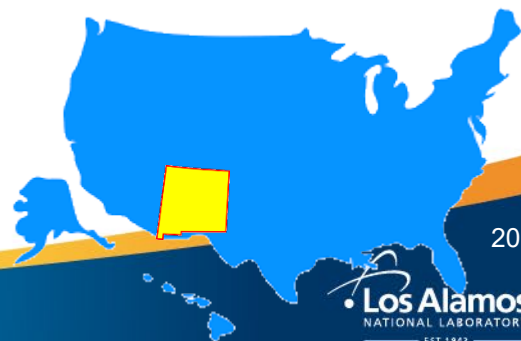
Select one of the following, then press "Go"

- Title 1 - General Administration
- Title 2 - Grants and Agreements
- Title 3 - The President
- Title 4 - Accounts
- Title 5 - Administration of the Government
- Title 38 - Pensions, Bonuses, and Veterans' Relief
- Title 39 - Postal Service
- Title 40 - Protection of Environment**
- Title 41 - Public Contracts and Property Management
- Title 42 - Public Health
- Title 43 - Public Lands

**Related Resources**  
The Code of Federal Regulations (CFR) annual edition is the codification of the general and permanent rules published in the *Federal Register* by the departments and agencies of the Federal Government produced by the

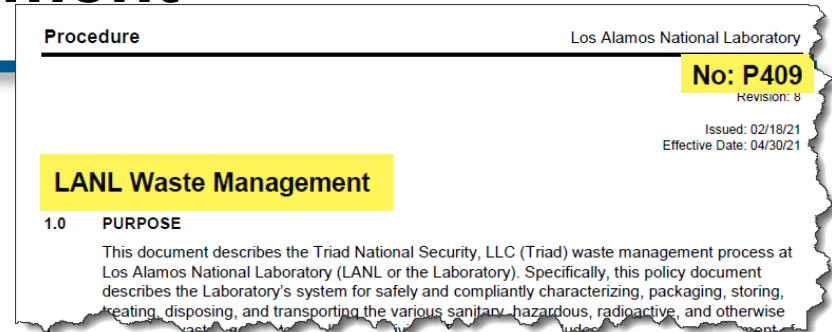
# State/Federal Relationship

- The federal government administers waste management regulations
  - Toxic Substances Control Act (TSCA or TOSCA)
  - Atomic Energy Act (AEA)
  - Clean Water Act (CWA)
  - Hazardous Materials Transportation Act (HMTA)
- States can obtain authorization to administer the RCRA regulations for the EPA
  - Most states (including New Mexico) are so authorized
    - State regulatory program must be at least equivalent to the federal program but ***can be more stringent*** than the federal requirements



# P409 LANL Waste Management

- Waste is a big issue at LANL
- We manage our waste per **P409**; *LANL Waste Management*
- Many associated policies and procedures
  - **P409-1**; LANL Waste Acceptance Criteria (WAC)
  - **FSD**: Functional Series Document
  - **RD**: Requirements Document
  - **IG**: Instructional Guideline
  - **TP**: Technical Procedure
  - **AP**: Administrative Procedure



**We integrate all of the federal, state, DOE, etc. requirements into a comprehensive LANL waste management program**

# What Happens to LANL's Waste?

- Waste generated at LANL are dispositioned at approved, licensed offsite Treatment, Storage, Disposal, Facilities (TSDFs)
  - **Sanitary trash** → Los Alamos county landfill
  - **Industrial waste (trash)** → Rio Rancho industrial landfill
  - **HAZ/TSCA** – various permitted commercial non-rad TSDFs
  - **LLW/MLLW** – NNSS, and various commercial rad TSDFs
  - **TRU/MTRU** – WIPP

**NOTE:** LANL (Triad) has several TSDFs)

- TA-55/CMR for treatment and storage
- Open burn/open detonation pits
- And more



# WHEN do Requirements Apply to this Waste?

- The waste management requirements apply as soon as waste is generated.
  - Onsite requirements
    - Regulatory + internal LANL
  - In transit: Onsite
    - LANL and/or DOT
  - In transit: Offsite
    - DOT
  - Receiving Treatment, Storage, Disposal Facility (TSDF)
    - Their own requirements









# We discover it...

- Testing/Investigation



Does it react with other stuff?

Is it radioactive?

What is the pH of the substance?

Is it corrosive?

Does ANYONE know about this?

Is it flammable?

Is it toxic?

***There is regulatory liability.  
This is costly and difficult to manage.***



# Required to keep track of it

- **Cradle to Grave**
  - Manufacturer's information
  - Process information
  - Sampling results
- **Birth Certificate**
  - What is this waste?
  - Where did it come from?
  - How did it get here?
- **Passport**
  - Track all the moving around it does
- **Activity Log**
  - All the things we do with/to it
- **Death Certificate**
  - Disposed of / Buried



# Waste Characterization and Tracking System: WCATS

- User Permissions
- Waste Streams
- Work Paths
  - Strict
  - Permissive
- WCATS Tasks:
  - Processing / Treatment
  - Shipping / Transfer
  - Disposal
  - Administrative
  - Characterization
- Containers
  - Creation
  - Tracking

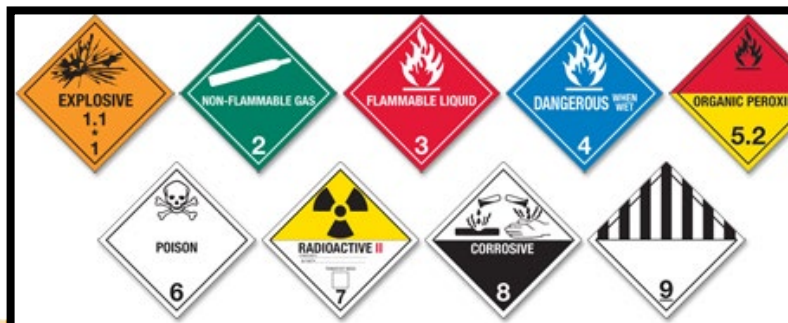
*For waste, you need to have a system/application to perform all of these functions.*



*The future of waste operations at LANL.*

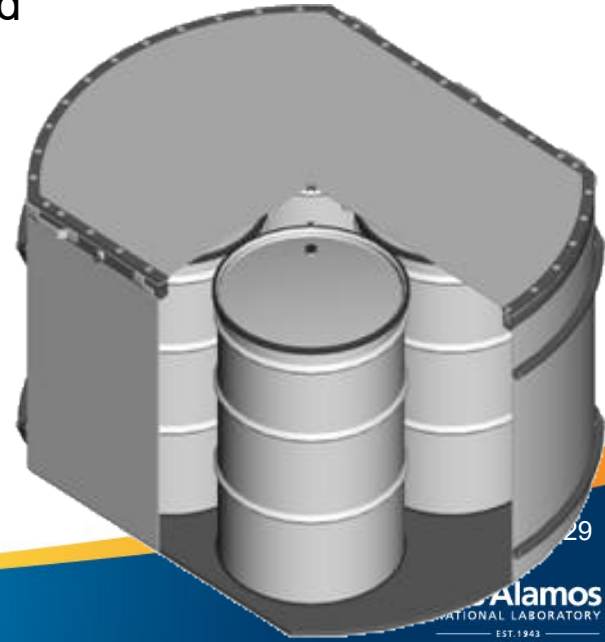
# Signs, Labels, and Markings

- Wastes must be labeled/marked
- Labels vary based on the waste type and whether in storage or in transit
  - Labels must be maintained
  - Faded labels need to be replaced!



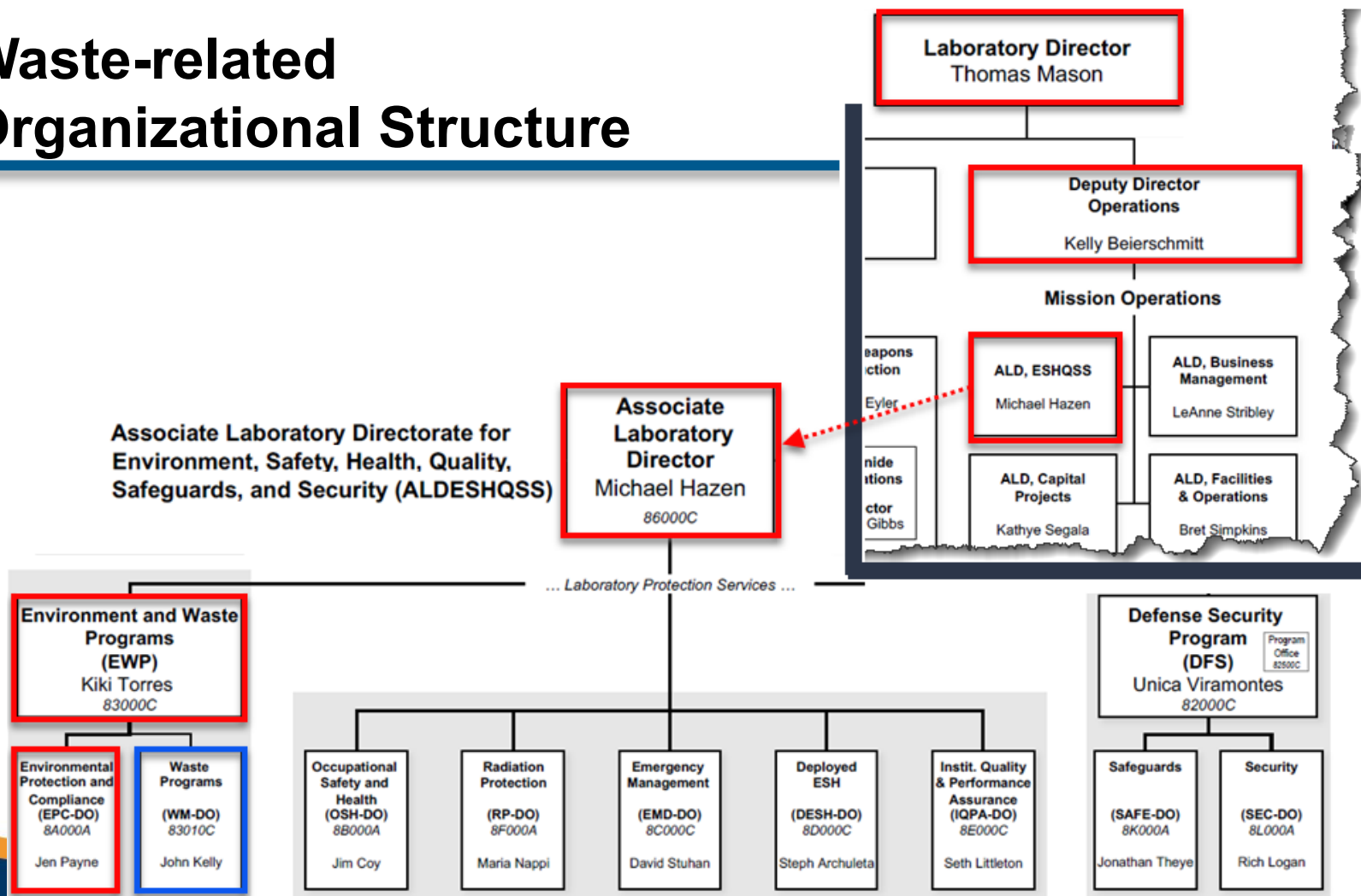
# Waste Containers

- **Waste must be in approved, compatible containers**
  - Varies depending on waste type and whether in storage or transit
    - When they can be open, when they must be closed
    - Required markings / labels
    - Documentation required for waste containers
      - Procurement
      - Closure

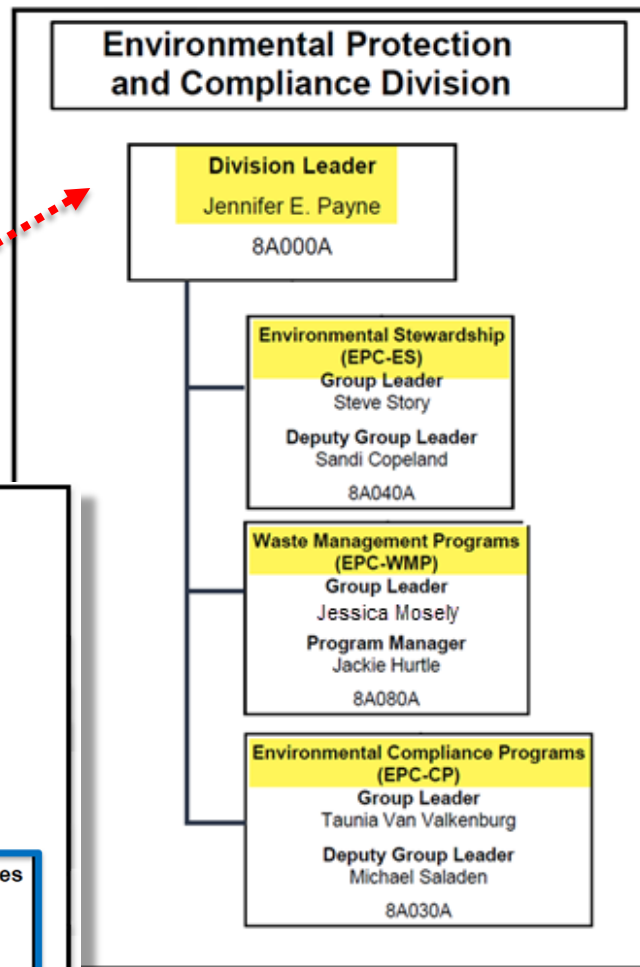
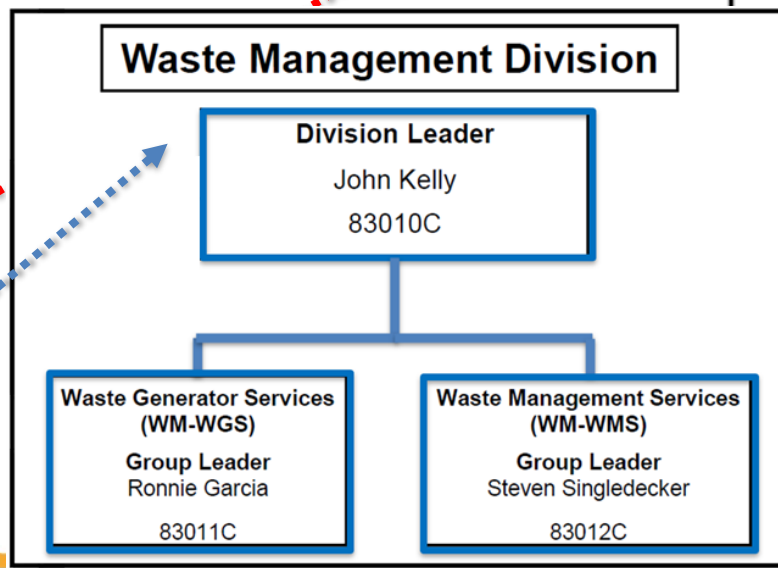




# Waste-related Organizational Structure



# Waste-related Organizational Structure



# Personnel Involved in Waste-related Activities

- Waste Generator
- Process Personnel
- Technical Personnel
- Waste Management Coordinator
- Waste Characterization Operator
- Waste Sampling Professional
- Waste Stream Profile Reviewer
- Deployed Environmental Professional
- Packagers / (Authorized) Shippers
- Waste Certification Officials
- LANL/NNSS Waste Package Certifier
- Drivers
- Auditors/Assessors
- Managers/Supervisors

EPC-WMP-QS-003 Revision: 2  
Effective Date: 04/10/2018 Next Review Date: 04/10/2021  
Los Alamos NATIONAL LABORATORY EST. 1943

Environment, Safety, and Health Directorate  
Environmental Protection and Compliance Division  
Waste Management Programs Group  
Qualification Standard

LANL Waste Management Coordinator Qualification Standard  
Document Owner/Subject Matter Expert:

Name: Ronnie Garcia	Organization: EPC-WMS	Signature: Signature on File	Date: 04/09/2018
Name: Benjamin J. Baca	Organization: OSH-PI	Signature: Signature on File	Date: 04/09/2018

- **Most** of these positions have **training/qualification requirements**
- Some positions have an associated **Qualification Standard** that identifies the training required
- Each worker must also be **AUTHORIZED** in WQAS



# Working Together

- **Waste Generators**

- Project Managers
- Process Personnel
- Researchers
- Maintenance Technicians
- Etc.

- **Waste Management Coordinators/Waste Management Technicians (WMC/WMT)**

- Assigned to facilities/projects to support waste generators



# Waste-related Programs At LANL

Source reduction is the elimination of **waste** before it is created.

- Like good stewards of the earth everywhere, we have various programs in place to eliminate or minimize waste
- **Green is Clean (GIC) Program:**
  - Designed to reduce radioactive low-level waste (LLW) generation through a waste segregation and verification program based on acceptable knowledge (AK) and screening.

**RETHINK:** Invent sustainable solutions

**REFUSE:** Say “no” to single-use items

**REDUCE:** Minimize waste

**REUSE:** Purchase multiple-use items

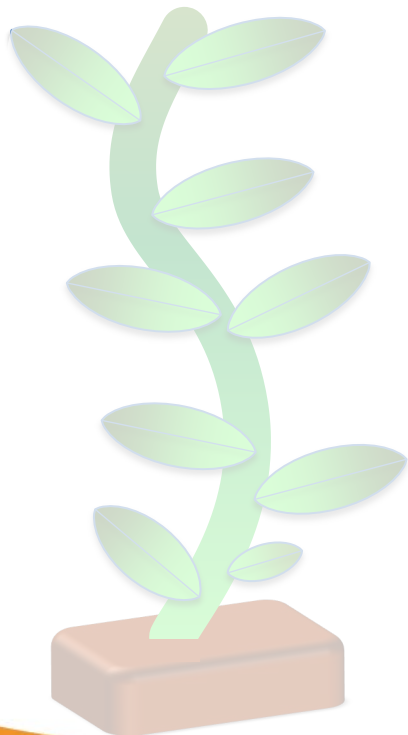
**REPAIR:** Fix broken items

**RECYCLE:** Follow local guidelines

- **Eliminating and minimizing waste is a form of Pollution Prevention**

# In Summary

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SUMMARY



# SUMMARY – What is Waste

RCRA states that "**solid waste**" means any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, resulting from industrial, commercial, mining, and agricultural operations, and from community activities.



Waste

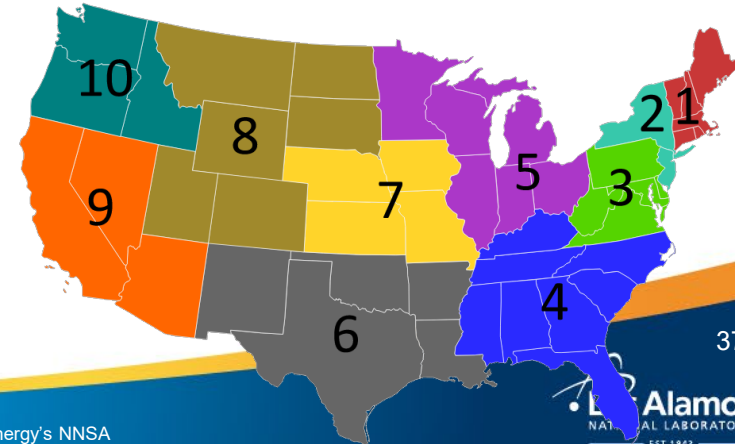
# SUMMARY – Waste Management in the U.S.

**1954** - Atomic Energy Act (AEA)

**1965** - Congress passes the **Solid Waste Disposal Act (SWDA)**

**1970** - The **EPA**, an independent executive agency of the U.S. federal government is established (Ten regions)

**1976** - The **Resource Conservation and Recovery Act (RCRA)** was passed by congress as an amendment to the **SWDA**



Waste Management

Waste

# SUMMARY – RCRA and Other Waste Requirements

**RCRA** is our nation's primary law governing the disposal of solid and hazardous waste.

- But, it's not the only law governing the disposal of waste
  - ✓ **Toxic Substances Control Act (TSCA or TOSCA)**
  - ✓ **Clean Water Act (CWA)**
  - ✓ **Hazardous Material Transportation Act (HMTA)**
  - ✓ **New Mexico Special Waste (NMSW)**

EPA has principal implementation authority for the following federal environmental laws:

- Clean Air Act
- Clean Water Act
- Comprehensive Environmental Response, Compensation and Liability Act ("Superfund")
- Emergency Planning and Community Right-to-Know Act
- Federal Insecticide, Fungicide, and Rodenticide Act
- Resource Conservation and Recovery Act
- Safe Drinking Water Act
- Toxic Substances Control Act
- Frank R. Lautenberg Chemical Safety for the 21st Century Act

There are additional laws where EPA has a contributing role or provides assistance to other agencies. Among these laws are:

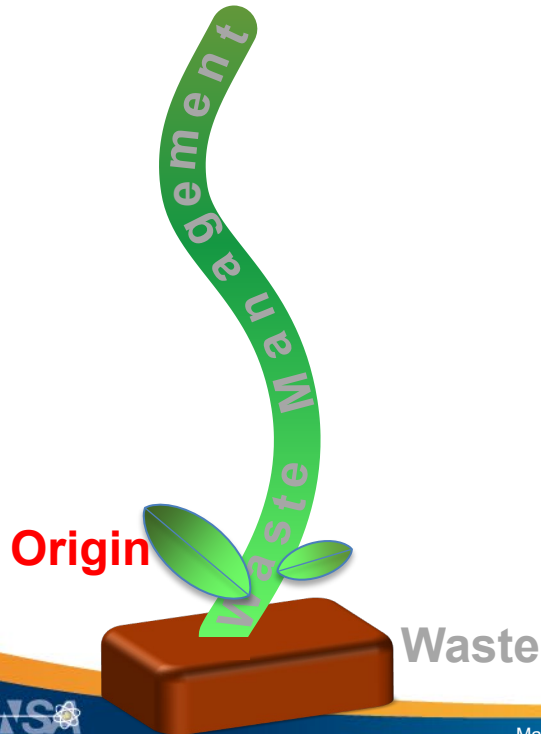
- Endangered Species Act
- Energy Independence and Security Act
- Energy Policy Act
- Federal Food, Drug, and Cosmetic Act
- Food Quality Protection Act
- National Environmental Policy Act
- Oil Pollution Act
- Pollution Prevention Act

Waste Management

Waste



# SUMMARY – Where Waste Comes From



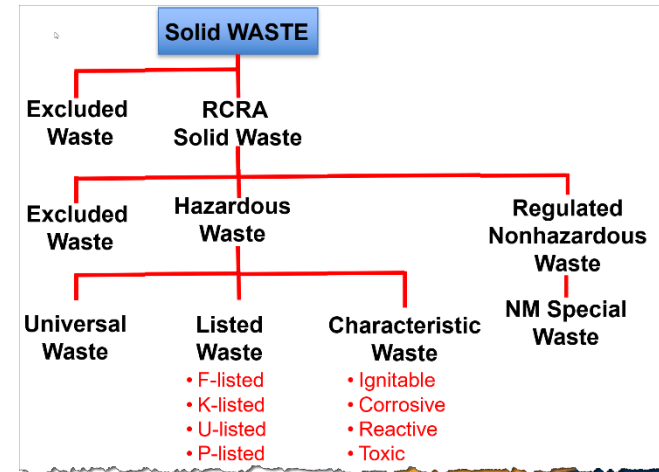
- **We purchase it**
  - ✓ It becomes a discarded chemical product if unused
- **We make it**
  - ✓ Manufacturing
  - ✓ Research
- **We discover it**
  - ✓ Legacy materials
  - ✓ Abandoned



# SUMMARY – Hazardous Waste

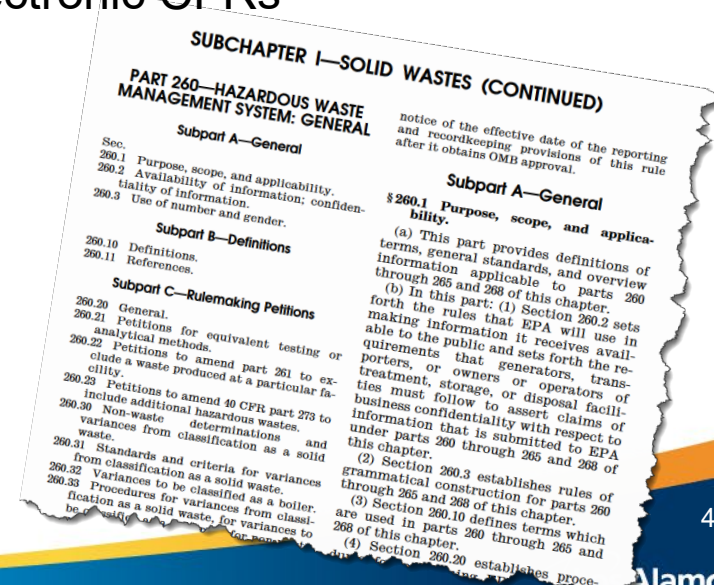
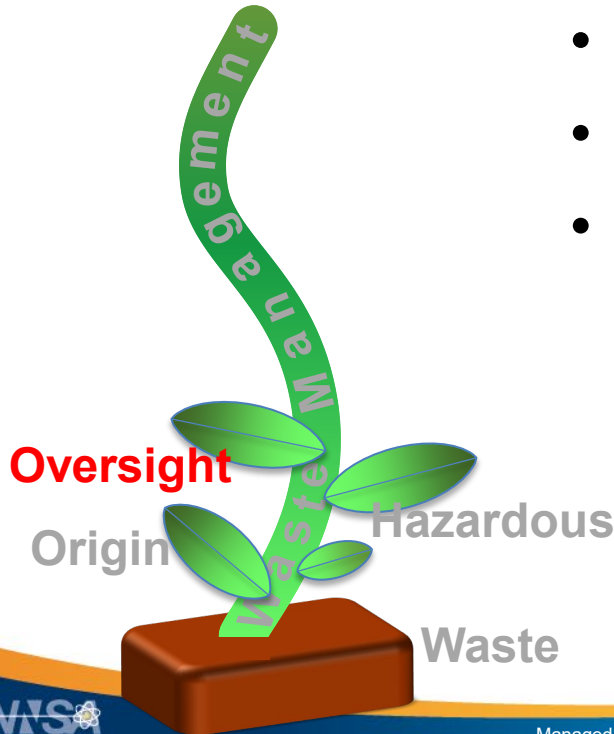


- **Hazardous Waste** is **solid waste** that is dangerous or potentially harmful to our health or the environment.
  - ✓ “**Solid waste**” can be liquids, solids, gases, or sludges.
- **Categories:**
  - ✓ **Listed waste**
    - P, U, F, and K
  - ✓ **Characteristic waste:**
    - Ignitability / Corrosivity / Reactivity / Toxicity
  - ✓ **Universal waste**
    - designated wastes



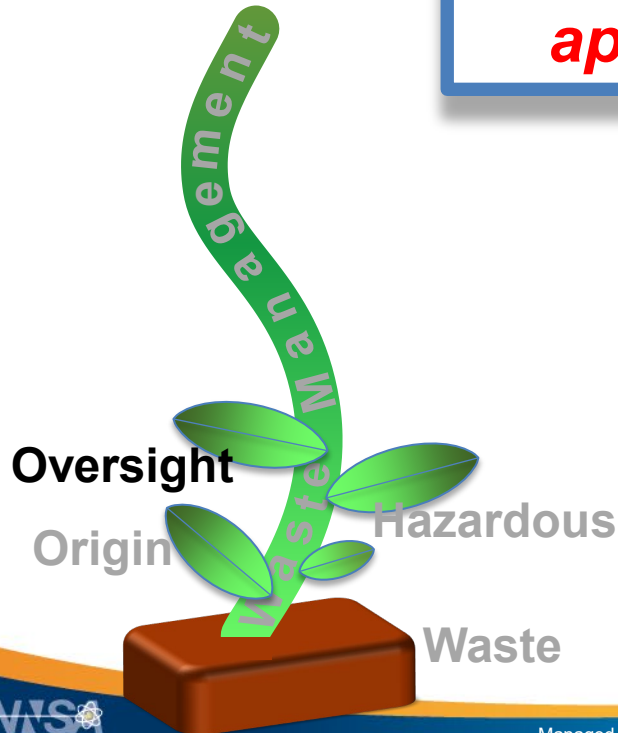
# SUMMARY – Waste Activity Oversight

- Federal
- State
- Local
- LANL
- RCRA: 40 CFR Parts 260-279
- [www.ECRF.gov](http://www.ECRF.gov)
- ✓ Electronic CFRs



# SUMMARY – When do Requirements Apply

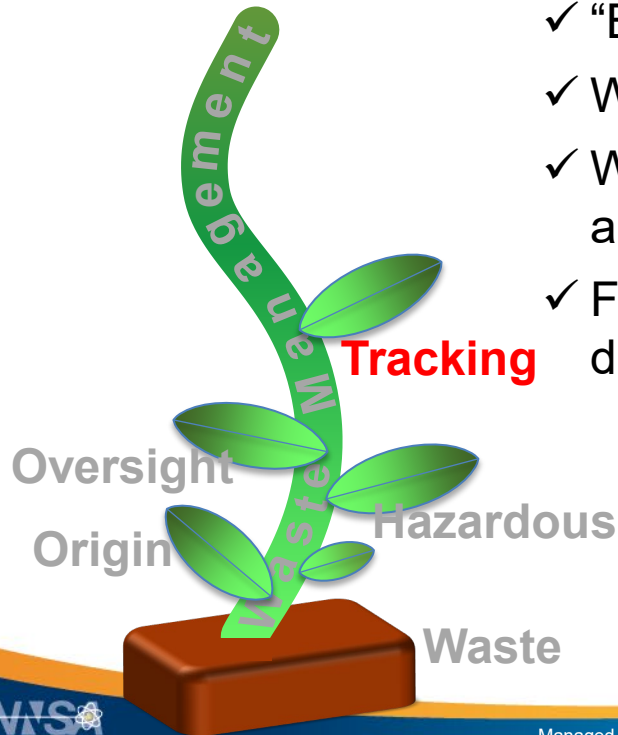
***The waste management requirements apply as soon as waste is generated.***



- Onsite requirements
- In transit: Onsite
- In transit: Offsite
- Receiving Treatment, Storage, Disposal Facility (TSDF)
  - ✓ Waste Acceptance Criteria (WAC)



# SUMMARY – Tracking Waste



- **Cradle to Grave**

- ✓ “Birth” information
- ✓ Where it goes
- ✓ What happens to it along the way
- ✓ Final destination / disposition

- **User Permissions**

- **Waste Streams**

- **Work Paths**

- ✓ Strict / Permissive

- **WCATS Tasks:**

- ✓ Processing / Treatment
- ✓ Shipping / Transfer
- ✓ Disposal
- ✓ Administrative
- ✓ Characterization

- **Containers**

- ✓ Creation / Tracking



*The future of waste operations at LANL.*

# SUMMARY – Signs, Labels, and Markings

- Wastes must be labeled/marked
- Labels vary based on the waste type and whether in storage or in transit
  - ✓ Labels must be maintained
  - ✓ Faded labels need to be replaced

Signs,  
Labels,  
Markings

Tracking

Oversight

Origin

Hazardous

Waste



HAZARDOUS WASTE	
FEDERAL LAW PROHIBITS IMPROPER DISPOSAL. IF FOUND, CONTACT THE NEAREST POLICE, OR PUBLIC SAFETY AUTHORITY, OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY.	
PROPER D.O.T. SHIPPING NAME	UN OR NA#
GENERATOR INFORMATION:	
NAME	
ADDRESS	
CITY	STATE ZIP
EPA ID NO.	EPA WASTE NO.
ACCUMULATION START DATE	MANIFEST DOCUMENT NO.
HANDLE WITH CARE! CONTAINS HAZARDOUS OR TOXIC WASTES	

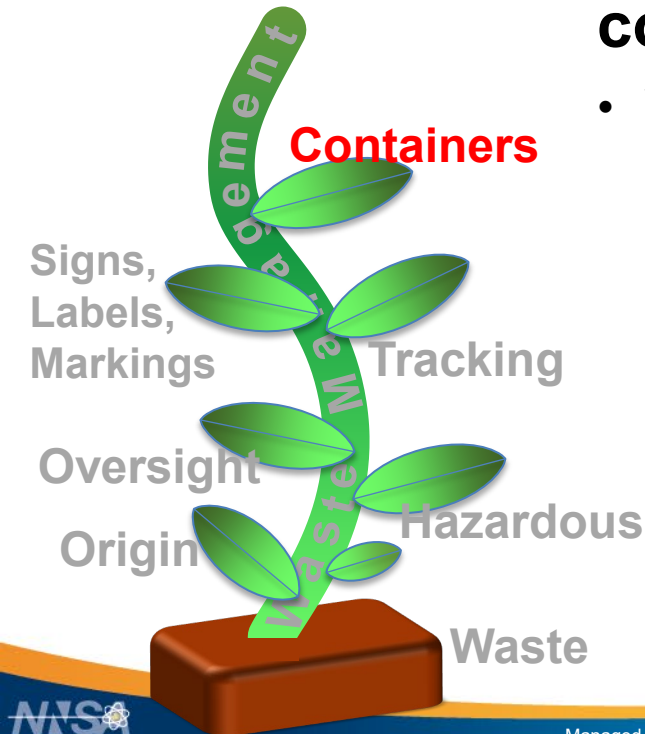




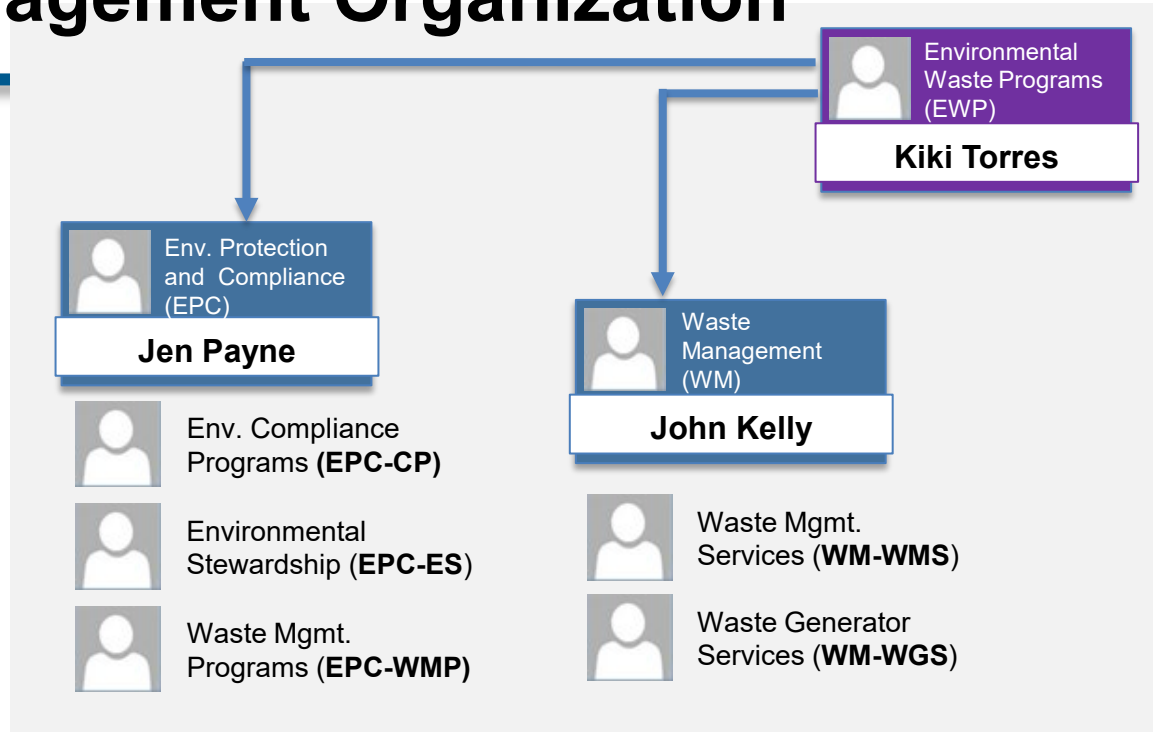
# SUMMARY – Waste Containers

## Waste must be in approved, compatible containers

- Varies depending on waste type and whether in storage or transit
  - ✓ When they can be open, when they must be closed
  - ✓ Required markings / labels
  - ✓ Documentation required for waste containers
    - Procurement
    - Closure



# SUMMARY – Waste Management Organization



# SUMMARY – People Involved



- Waste Generator
- Technical Personnel
- Waste Management Coordinator
- Waste Characterization Operator
- Waste Sampling Professional
- Waste Stream Profile Reviewer
- Deployed Environmental Professional
- Packers / (Authorized) Shippers
- Waste Certification Officials
- LANL/NNSS Waste Package Certifier
- Drivers
- Auditors/Assessors
- Managers/Supervisors

## Waste Generators

- Project Managers
- Researchers
- Maint. Techs
- Etc.



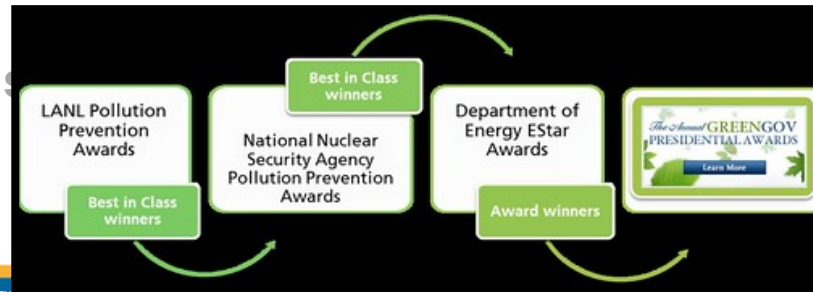
## Waste Management Coordinators (WMCs)

*Assigned to facilities / projects to support waste generators*

# SUMMARY – LANL Waste-Related Programs

- LANL Waste-Related Programs

## Programs



Managed by Triad National Security, LLC for the U.S. Department of Energy's NNSA

# Enabling Objectives

---

- List fundamental attributes of waste
- Recognize regulatory agencies and significant regulations involved in U.S. waste management
- List the three broad origins of waste
- List the agencies that oversee waste management activities at LANL
- Describe how waste and waste-related activities are tracked across LANL
- Recognize the importance of signs, labels, and markings related to waste
- Recognize the importance of various aspects of waste containers
- Identify organizations and personnel associated with waste activities at LANL
- Identify LANL policies and programs that apply to waste



# Extra Information

---

- Abbreviations and acronyms





## Abbreviations and Acronyms

- We use a **LOT** of waste-related abbreviations and acronyms
  - If you come across one you don't know, ask

[illegible]

# Abbreviations and Acronyms

- We use a **LOT** of waste-related **organizations**

– If you come across one you don't know, ask

ALD ESHQSS  
NPI-6 EPC  
WM-WMS PPMI  
NPI-9 EPC-WMP WM  
EPC-ES NPI-7  
EPC-CP  
EWP

# Abbreviations and Acronyms

- **AEA** – Atomic Energy Act (1954)
- **AK** – Acceptable Knowledge
- **AP** – Administrative Procedure
- **CAA** – Continuous Accumulation Area
- **CFR** – Code of Federal Regulations
- **CWA** – Clean Water Act (1972)
- **DOT** – Department of Transportation
- **ENU** – Elementary Neutralization Unit (exemption)
- **EPA** – Environmental Protection Agency
- **EXID** – Excavation/Fill/Soil Identification Disturbance
- **FSD** – Functional Series Document
- **GIC** – Green is Clean
- **HMTA** – Haz Material Transportation Act (1975)
- **HSWA** – Haz and Solid Waste Amendments (1984)
- **HW** – Hazardous Waste
- **IG** – Instructional Guideline
- **IRT** – Integrated Project Review Tool
- **LDR** – Land Disposal Restriction
- **LLW** – Low Level Waste
- **MCE** – Mercury containing equipment
- **MLLW** – Mixed Low Level Waste
- **MSDS** – Material Safety Data Sheet
- **MTRU** – Mixed TRU Waste
- **NDA** – Nondestructive Analysis
- **NESHAPS** – National Emission Standards for Hazardous Air Pollutants
- **NMED** – New Mexico Environment Department
- **NPDES** - National Pollutant Discharge Elimination System
- **NMHW** – New Mexico Hazardous Waste Act
- **NMSW** – New Mexico Special Waste
- **NRC** – Nuclear Regulatory Commission (1974)

# Abbreviations and Acronyms (Continued)

- **P2** – Pollution Prevention
- **PCB** – Polychlorinated biphenyl
- **PCS** – petroleum contaminated soils
- **PRID** – Permits and Requirements Identification
- **RCRA** – Resource Conservation and Recovery Act
- **RD** – Requirements Document
- **RWMB** – Radioactive Waste Management Basis
- **SAA** – Satellite Accumulation Area
- **SDS** – Safety Data Sheet
- **STP Manager** – Site Treatment Program (manager)
- **SWDA** – Solid Waste Disposal Act (1965)
- **TFCH** – Treated formerly characteristic waste
- **TOS** – Termination of Safeguards
- **TP** – Technical Procedure
- **TRU** – Transuranic Waste
- **TSCA** – Toxic Substance Control Act (1976)
- **TSD** – Treatment, Storage, and Disposal (Facility)
- **UHC** – Underlying Hazardous Constituents
- **UHWA** – Uniform Hazardous Waste Manifest
- **WAC** – Waste Acceptance Criteria
- **WAP** – Waste Analysis Plan
- **WCATS** – Waste Compliance and Tracking System
- **WCSF** – Waste Characterization Strategy Form
- **WGTP** – Waste Generator Treatment Plan
- **WIPP** – Waste Isolation Pilot Plant
- **WIRA** – Waste Information Reporting Application
- **WMC** – Waste Management Coordinator
- **WSP** – Waste Stream Profile

# Dates

---

- 1943 – LANL
- 1954 – AEA
- 1965 – SWDA
- 1970 – EPA
- 1972 – CWA
- 1975 – HMTA
- 1976 – RCRA
- 1976 – TSCA
- 1984 – HWSA
- 1992 – Fed Facilities
- 1996 – LDR Flexibility

# Enabling Objectives



- List fundamental attributes of waste
- Recognize regulatory agencies and significant regulations involved in U.S. waste management
- List the three broad origins of waste
- List the agencies that oversee waste management activities at LANL
- Describe how waste and waste-related activities are tracked across LANL
- Recognize the importance of signs, labels, and markings related to waste
- Recognize the importance of various aspects of waste containers
- Identify organizations and personnel associated with waste activities at LANL
- Identify LANL policies and programs that apply to waste



# The Modules

---

- ~~1: Intro to Waste~~ ✓
- 2: Waste Regulations and Requirements
- 3: Waste Planning
- 4: Waste Generation and Tracking
- 5: Waste Characterization
- 6: Waste Packaging
- 7: Waste Accumulation and Storage
- 8: Waste Treatment
- 9: Waste Shipping
- 10: Operating Experience and Lessons Learned

# The End





# Module 2: Waste Regulations and Requirements

Waste Management Fundamentals  
for Environmental Professionals

UTrain: 50448

Revision 0; Aug. 2021



# The Modules

**YOU**  
*are*  
**HERE**

- 1: ~~Intro to Waste~~ ✓
- 2: **Waste Regulations and Requirements**
- 3: Waste Planning
- 4: Waste Generation and Tracking
- 5: Waste Characterization
- 6: Waste Packaging
- 7: Waste Accumulation and Storage
- 8: Waste Treatment
- 9: Waste Shipping
- 10: Operating Experience and Lessons Learned

# Topics

---

- Drivers
  - Federal
  - State
  - Internal
- Consequences of non-compliance

TOPICS



# Enabling Objectives

---

- Identify regulatory drivers associated with waste management at LANL
- Recognize the regulatory agencies involved in waste activities at LANL
- Identify where waste-regulating agencies get their authority
- Recognize principles related to hazardous waste regulations
- Recognize the consequence of non-compliance to waste management requirements





# Drivers

- **Federal drivers:**

- Resource Conservation and Recovery Act (RCRA)
- Hazardous and Solid Waste Amendments (HSWAs)
- Toxic Substance Control Act (TSCA)
- Hazardous Materials Transportation Act (HMTA)
- DOE Orders

- **State drivers:**

- New Mexico Hazardous Waste Act (NMHWA or HWA)
- LANL Hazardous Waste Facility Permit
- Administrative Compliance Order HWB-14-20
- Settlement Agreement and Stipulated Final Order HWB-14- 20 (CO);

- **Internal drivers:**

- Triad/DOE Contract (aka the “**Prime Contract**”)
- LANL Policy and Procedures
  - P409; *LANL Waste Management*
    - ✓ *Over 50 supporting documents*



# Federal Drivers

- **(10 CFR) Nuclear Regulatory Commission and Department of Energy (NRC and DOE)**
- **Atomic Energy Act (AEA)**
  - Manages Radioactive Waste
- **(40 CFR) Environmental Protection Agency (EPA)**
  - Resource Conservation and Recovery Act (RCRA)
  - Hazardous and Solid Waste Amendments (HSWAs)
  - Toxic Substance Control Act (TSCA)
- **(49 CFR) Department of Transportation (DOT)**
  - Hazardous Materials Transportation Act (HMTA)
- **DOE Orders**



The following table lists the subtitles that provide a programmatic framework for the regulated community to follow.

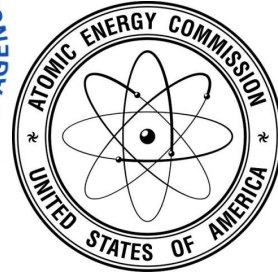
Standards for . . .	are provided in . . .
hazardous waste management	Subtitle C
solid waste management	Subtitle D

# RCRA - Goals

- Regulatory framework **goals** for managing solid and hazardous waste:
  - Protect human health and the environment from potential waste disposal hazards
  - Conserve energy and natural resources
  - Reduce the amount of waste generated
  - Manage waste in an environmentally sound manner
  - Implement corrective action program to clean up contaminated sites created from past practices.
- RCRA establishes directives and guidelines for the EPA to regulate solid and hazardous waste management and disposal.
    - RCRA legislation has 10 subtitles, 4 of which are regulated.



# RCRA and AEA



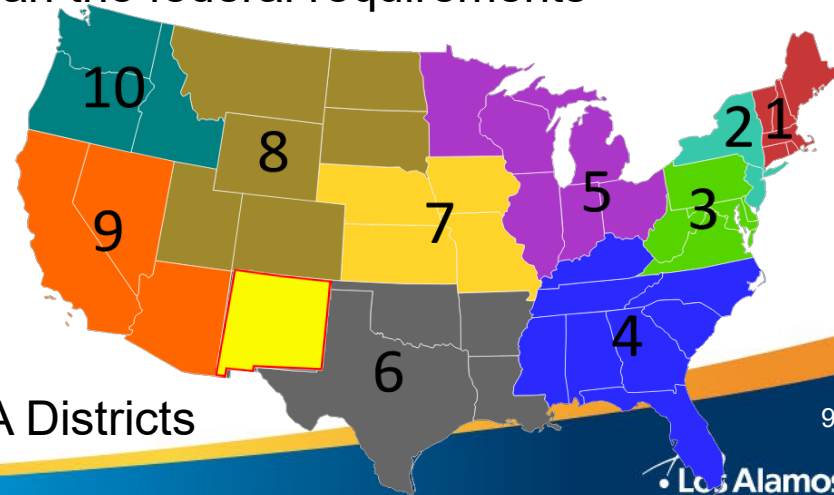
- Mixed waste falls under two federal statutes: RCRA and the Atomic Energy Act (AEA)
  - RCRA regulates the hazardous waste portion of the waste as any other hazardous waste, while the AEA regulates the RCRA-exempt radioactive portion.
  - If waste is categorized as “**mixed waste**,” the handlers must comply with both AEA and RCRA statutes and regulations, which are usually compatible.
  - In the cases where AEA and RCRA contradict each other, the provisions in Section 1006(a) of RCRA allow the AEA to take precedence over RCRA.

# RCRA State/Federal Relationship

- States can obtain authorization to administer the RCRA regulations for the EPA
  - Most states (including New Mexico) are so authorized
  - State regulatory program must be at least equivalent to the federal program but **can be more stringent** than the federal requirements



LANL is not 'dual regulated' by both EPA and NMED



10 EPA Districts

# Hazardous Waste Regulations

We call this  
“Cradle-to-Grave”

- Hazardous waste regulations were developed by the EPA in an effort to meet the intent of RCRA. The regulations provide an enforcement mechanism for state and federal regulatory agencies and require the implementation of measures that ensure proper waste management from the point of generation to ultimate disposal.
- RCRA hazardous and solid waste regulations are applicable to generators, transporters, and owners or operators of facilities that treat, store, or dispose of wastes. Major elements of the hazardous waste regulations **[Title 40 of the Code of Federal Regulations (CFR) Parts 260–282]** include:

More to come about waste generators





# Hazardous Waste Regulations

- ✓ Characterization and classification of hazardous waste
- ✓ Generator, transporter, treatment, and storage facility (TSF) standards
- ✓ Recycling standards
- ✓ Controls on land disposal
- ✓ Permitting requirements
- ✓ State program requirements
- ✓ Used oil management standards
- ✓ Universal waste management standards
- ✓ Underground storage tank requirements



# Hazardous and Solid Waste Amendments (HSWA of 1984)

- Significantly expanded the regulatory scope of RCRA and introduced requirements to ensure that groundwater is protected from chemical contamination. Requirements under the HSWA that are most applicable to LANL operations include environmental cleanup of contaminated sites and restrictions on future land disposal of many untreated hazardous wastes

Environmental cleanup and corrective actions associated with releases of hazardous waste or constituents are required by federal and state regulatory agencies for facilities that treat, store, or dispose of hazardous waste. Environmental cleanup and corrective actions are necessary to protect human health and the environment.



The EPA has developed treatment standards for hazardous wastes. The objective of a treatment standard is to develop concentration levels (based on the best-demonstrated available technology for treated wastes) below which they may be safely land disposed.

Because of concerns that hazardous chemicals leaching from waste at land disposal sites could migrate through the soil and ultimately contaminate the groundwater, the EPA imposed stringent controls on the land disposal of hazardous wastes.

### Land Disposal Restrictions (LDR)

In general, the LDR program requires that any hazardous waste destined for land disposal be treated to reduce the toxicity and/or mobility of the hazardous constituents. Treatment standards were established for every hazardous waste; wastes meeting the treatment standards may be land disposed.

**Note:** Occasionally the EPA establishes a technology-based treatment standard that requires the use of a specific technology on a particular waste stream before it is eliminated by land disposal.



# Toxic Substances Control Act (TSCA)

- The TSCA was decreed by Congress in response to public concerns over growing evidence of the toxicological effects of chemicals introduced into the market. The primary purpose of the TSCA is to characterize and understand the risks that a chemical poses before the chemical is introduced for public use
- The TSCA is intended to provide protection from toxic substances manufactured, processed, distributed, or used in the United States (US). TSCA regulations (40 CFR 700 series) include the following requirements:
  - new substances must be screened for health and safety hazards before the substances are marketed
  - existing substances must be tested for health and safety hazards
  - hazardous substances must be controlled for public protection



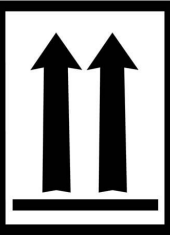
# Hazardous Material Transportation Act (HMTA)

- The Department of Transportation (DOT) issues regulations (through the HMTA) that govern the transportation of hazardous and mixed waste in transit or in storage for transit.
- RCRA regulations governing waste transportation refer to - and coordinate with - DOT regulations. In addition to DOT-required documentation, RCRA requires the completion of an additional document for waste-tracking purposes—the **uniform hazardous waste manifest** (UHWM). As agreed by DOT and the EPA, the UHWM is the shipping paper for the transport of RCRA-regulated wastes.
- DOT regulations (49 CFR 171–178) for transporting hazardous or mixed waste include requirements for:



# Hazardous Material Transportation Act (HMTA)

- ✓ DOT shipping information
- ✓ Packaging
- ✓ Marking
- ✓ Labeling
- ✓ Placarding



§172.101 HAZARDOUS MATERIALS TABLE

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or Division	Identification Numbers	PG	Label Codes	Special provisions (§172.102)	(8) Packaging (§173.***)			(9) Quantity limitations (see §§173.27 and 175.75)		(10) Vessel stowage	
							Exceptions	Non-bulk	Bulk	Passenger aircraft/rail	Cargo aircraft only	Location	Other
A W	Mercury		8UN2809	III	8, 6.1	365	164	164	240	35 kg	35 kg	B	40, 97
G	Mercury compound, solid, n.o.s	6.1	UN2025	I	6.1	IB7, IP1, T6, TP33	None	211	242	5 kg	50 kg	A	
				II	6.1	IB8, IP2, IP4, T3, TP33	153	212	242	25 kg	100 kg	A	
				III	6.1	IB8, IP3, T1, TP33	153	213	240	100 kg	200 kg	A	
A W	Mercury contained in manufactured articles		UN3506		8, 6.1	A191	164			limit	No limit	B	40, 97

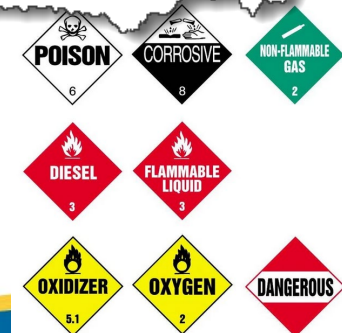
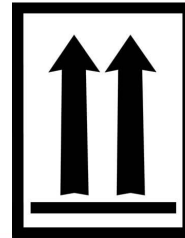




# Hazardous Material Transportation Act (HMTA)

**Note:** Hazardous waste transportation over public roads within Los Alamos County must comply with DOT requirements.

**Note:** Hazardous and mixed wastes are considered **Hazardous Substances** under DOT



# DOE Orders

- LANL is operated by Triad for the National Nuclear Security Administration (NNSA) of the DOE. The DOE issues orders that address:
  - compliance with applicable federal and state laws, regulations, and standards
  - radioactive waste management requirements (DOE Order 435.1)
- The Triad/DOE (“**prime**”) contract stipulates the DOE Orders that LANL must follow. DOE has the authority to perform audits and shut down operations for noncompliance with these orders.
  - For more information on management of radioactive waste, consult FSD-P409-0201, *Radioactive Waste Management*



# DOE O 435.1; Radioactive Waste Management

U.S. Department of Energy

Washington, D.C.

ORDER

DOE O 435.1

Approved: 7-09-99

Review: 7-09-01

**SUBJECT: RADIOACTIVE WASTE MANAGEMENT**

1. OBJECTIVE. The objective of this Order is to ensure that all Department of Energy (DOE) radioactive waste is managed in a manner that is protective of worker and public health and safety, and the environment.
2. CANCELLATION. This Order cancels DOE 5820.2A, RADIOACTIVE WASTE MANAGEMENT, dated 9-26-88. Cancellation of that Order does not, by itself, modify or otherwise affect any contractual obligation to comply with the Order. The provisions of this canceled Order which have been incorporated by reference in a contract shall remain in effect until the contract is modified.
3. APPLICABILITY.
  - a. DOE Elements. This Order applies to all DOE elements except as stated in item "d."
  - b. Radioactive Waste. Except as stated in item "d," this Order applies to the management of:

**Distribution:**  
All Departmental Elements

**Initiated By:**  
Office of Environmental Management

# DOE O 435.1

3 PAGES

DOE O 435.1

7-09-99

Attachment 1

Page 1

## CONTRACTOR REQUIREMENTS DOCUMENT

1. In the performance of this contract, the contractor is required to:
  - A. Systematically plan, document, execute, and evaluate the management of DOE radioactive waste and assist the government in planning, executing and evaluating the management of DOE radioactive waste in accordance with the requirements of DOE O 435.1, *Radioactive Waste Management*.
  - B. Assist the government in managing DOE radioactive waste so as to:
    - (1) Protect the public from exposure to radiation from radioactive materials.
    - (2) Protect the environment.
    - (3) Protect workers including following requirements for radiation protection.
  - C. Assist DOE in meeting its obligations and responsibilities under Executive Order 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*, and Executive Order 13101, *Greening the Government through Waste Prevention, Recycling, and Federal Acquisition*, and *The Pollution Prevention Act of 1990*.
  - D. Comply with the requirements in DOE M 435.1-1, *Radioactive Waste Management Manual*, unless such activities are specifically exempted by DOE O 435.1, Section 3.d., as described below.

68 PAGES

# Low Level Waste (LLW)

- DOE O 435.1 formally defines low-level radioactive waste as radioactive waste that is not high-level radioactive waste, spent nuclear fuel, transuranic waste, byproduct material (as defined in Section 11e.(2) of the Atomic Energy Act of 1954, as amended), or naturally occurring radioactive material.
  - Primarily, LLW generated at LANL is radioactive waste that contains less than 100 nCi/g of alpha-emitting transuranic radionuclides, with a half-life greater than 20 years.



# Rad Waste Staging/Storage Drivers

- Department of Energy (DOE) Order 435.1, ***Radioactive Waste Management*** provides overall policy
- DOE Manual 435.1-1, ***Radioactive Waste Management Manual*** is used to identify the attributes of the appropriate storage requirements and to recognize when waste storage requirements are applied
- P409, ***LANL Waste Management*** describes LANL requirements for waste generated and managed by waste generators and Treatment and Storage Facilities (TSFs) to ensure compliance with legal mandates and Laboratory requirements.
- FSD-P409-0600, ***Waste Accumulation and Storage*** is a lower tier procedure referenced in P409





# DOE M 435.1-1; Rad Waste Mgmt Manual

MANUAL

DOE M 435.1-1

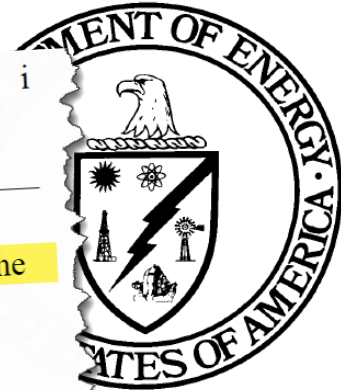
Approved: 7-09-99

Change 1: 6-19-01

Certified: 1-9-07

Change 2: 6-8-11

## RADIOACTIVE WASTE MANAGEMENT MANUAL



DOE M 435.1-1  
7-9-99

### RADIOACTIVE WASTE MANAGEMENT MANUAL

- 1 **PURPOSE.** This Manual further describes the requirements and establishes specific responsibilities for implementing DOE O 435.1, *Radioactive Waste Management*, for the management of DOE high-level waste, transuranic waste, low-level waste, and the radioactive component of mixed waste. The purpose of the Manual is to catalog those procedural requirements and existing practices that ensure that all DOE elements and contractors continue to manage DOE's radioactive waste in a manner that is protective of workers and public health and safety, and the environment.

Distribution:  
All Departmental Elements

Initiated By:  
Office of Environmental Management

# DOE M 435.1-1;

- There are 21 “general requirements” specified for radioactive waste

## F. Field Element Managers. Field Element Managers are responsible for:

- (1) Site-Wide Radioactive Waste Management Programs.
- (2) Radioactive Waste Management Basis.
- (3) Waste Minimization and Pollution Prevention.
- (4) Approval of Exemptions for Use of Non-DOE Facilities.
- (5) Environmental Restoration, Decommissioning, and Other Cleanup Waste. ]
- (6) Radioactive Waste Acceptance Requirements.
- (7) Radioactive Waste Generator Requirements.
- (8) Closure Plans. ]
- (9) Defense-In-Depth.
- (10) Oversight.
- (11) Training and Qualification.
- (12) As Low As Reasonably Achievable (ALARA).
- (13) Storage.
- (14) Treatment.
- (15) Disposal.
- (16) Monitoring.
- (17) Material and Waste Declassification for Waste Management.
- (18) Waste Incidental to Reprocessing.
- (19) Waste With No Identified Path to Disposal.
- (20) Corrective Actions.
- (21) Application of High-Level Radioactive Waste Interpretation.

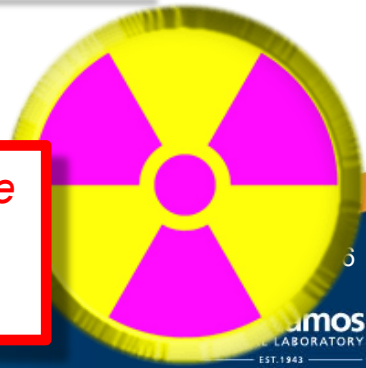
# DOE M 435.1-1; Rad Waste Mgmt Manual

<b>CHAPTER II - HIGH-LEVEL WASTE REQUIREMENTS</b>	II-1
A. Definition of High-Level Waste	II-1
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(1) Mixed Transuranic Waste	III-1
(2) TSCA-Regulated Waste	III-1
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B. Management of Specific Wastes	IV-1
(1) Mixed Low-Level Waste	IV-1
(2) TSCA-Regulated Waste	IV-1
(3) Accelerator-Produced Waste	IV-1
(4) 11e.(2) and Naturally Occurring Radioactive Material	IV-1
C. Complex-Wide Low-Level Waste Management Program	IV-1

# Radioactive Waste Management Basis (RWMB)

- Per P409: *In accordance with DOE O 435.1-1 Chg 2, Radioactive Waste Management, LANL must identify LLW, MLLW, TRU, and MTRU:*
  - *when it is generated*
  - *where there are changes in facility status (i.e., adding storage area, increasing waste volumes, etc.)*
  - *When the LLW is about to exceed the one-year storage limit*
- LANL meets this requirement using Form 2107; Radioactive Waste Management Basis Report Form (RWMB).
  - *The Waste Generator, RLM, or designee must submit the new or updated RWMB*

*(1) Keeping track of all the radioactive waste we have at LANL and, (2) how we store that radioactive waste.*



# Radioactive Waste Management Basis (RWMB)

## **DOE O 435.1**

- Ensure that all DOE radioactive waste is managed in a manner that is protective of worker and public health and safety, and the environment

## **DOE M 435.1-1**

- Any facility generating radioactive waste shall have a radioactive waste management basis consisting of controls and analysis such a facility waste certification programs, facility waste acceptance requirements, low-level waste disposal facility closure plans, performance assessments, composite analyses, and analysis made to comply with DOE O 435.1 and this Manual.

# Radioactive Waste M

- https://irm.lanl.gov/forms/Shared/2107.pdf

## What it Pertains To:

- All rad waste is covered in Facility RWMBs.
- The only waste that requires a one-year extension is the LLW.
- MLLW / MTRU are managed through RCRA unless the MLLW cannot be shipped and reaches one year – then it is added to the Site Treatment Plan.

NOTE: Use these buttons to print or save the form. DO NOT use the browser tool bar. SAVE PRINT Form 2107

**Los Alamos NATIONAL LABORATORY**  
EST. 1943

**Radioactive Waste Management Basis (RWMB) Report Form**

☐ Extension (Container List Attached)

FOD YR-MO, Rev. #

Report Date	Reporting Organization	Location (TA/Building/Room)	Facility Hazard: <input type="checkbox"/> High <input type="checkbox"/> Moderate <input type="checkbox"/> Low
Approval Request	FOD		Facility Type: <input type="checkbox"/> Nuclear-Facility <input type="checkbox"/> Accelerator <input type="checkbox"/> Non-Nuclear Facility <input type="checkbox"/> TSDF
____ Year(s)			

**Purpose/Instructions:** To identify radioactive waste activities throughout LANL facilities and to ensure they are in compliance with applicable requirements in DOE Order 435.1-1, *Radioactive Waste Management*, and DOE Manual 435.1, Chapter III, *Transuranic Waste Requirements*, and Chapter IV, *Low-Level Waste Requirements*. The reporting organization, must submit RWMBs and any attachments to Waste Management Program (WMP), including (1) new RWMBs (upon waste generation), (2) updated RWMBs (when there are changes in facility operations or waste status/streams, i.e., adding a storage area, increasing waste volumes, etc.), and (3) RWMB extensions (when waste has exceeded or is about to exceed the one-year storage limit). Note: Per P409, RWMB extensions must be submitted to the DOE field element manager at least 60 days before the storage expiration.

**Report Authorization**

Facility Operations Director (FOD)/Division Leader:

\_\_\_\_\_  
Name Signature Date

Report Preparer (FOD or RLM):

\_\_\_\_\_  
Name Signature Date

\_\_\_\_\_  
Name Signature Date

**Waste Certification Program (WCP) Annual Review**

Protection and Compliance (EPC):

\_\_\_\_\_  
Name Signature Date

**Waste Authorization Basis**

\_\_\_\_\_  
List all facility/operations authorization basis documents and include specific facility waste management documents.

Facility or Facility Document Name	Document Number	Last Rev. Date	Document Owner
Management Plan			
Record			
Safety Analysis (DSA)			
Safety Requirement (TSR)			
<input type="checkbox"/> Safety Evaluation Report (SER)			
<input type="checkbox"/> Health & Safety Plan/Job Hazard Analysis			
<input type="checkbox"/> Closure Plan (Disposal Facilities only)			
<input type="checkbox"/> Monitoring Plan (Disposal Facilities only)			
<input type="checkbox"/> DOE O 435.1, Exemption for Disposal at a Non-DOE Facility			
<input type="checkbox"/> Facility Waste Cert. Plan (FWCP). Do not complete pg. 3.			

Managed by Triad National Security, LLC for the U.S. Department of Energy's NNSA



The Site Treatment Plan (STP) Program has a responsibility per STP reporting and the Federal Facility Compliance Order (FFCO) to report mixed transuranic waste (MTRU) and mixed low level waste (MLLW) to the NMED Hazardous Waste Bureau.

The reporting applies to mixed waste stored for one year past the start accumulation date by various waste generators at LANL.

The STP and the FFCO are intended to allow DOE to store accumulated mixed waste for more than one year (which is otherwise prohibited by Land Disposal Requirements provision of RCRA) while identifying treatment/disposal options and working off inventory.

#### **What it Pertains To:**

- All rad waste is covered in Facility RWMBs.
- The only waste that requires a one-year extension is the LLW.
- MLLW / MTRU are managed through RCRA unless the MLLW cannot be shipped and reaches one year – then it is added to the Site Treatment Plan.

# RWMB Extension

- Submitted if it is foreseen that radioactive waste cannot be shipped for final disposition within one year of seal/closed date
  - The RWMB extension must be submitted to RWMB Program Lead 90 days before exceeding the 1-year expiration of the date the container was sealed. This will allow 30 days for the extension to go through the EPC review/approval process and 60 days (as required by DOE) for the DOE Field Element Manager to review and approve the extension for continued storage
  - A new RWMB, Form 2107, must be filled out by the FOD and then submitted to EPC-WMP, EPC-DO, and DOE for review and approval

# RWMB Extension

- EPC-WMP personnel may perform periodic walk-downs of radioactive waste-generating facilities to ensure radioactive waste has not exceeded the 1 year storage limit.
  - If waste has exceeded the storage limit, ensure compliance is met via an active, approved RWMB extension.
- If EPC-WMP determines that an extension request was never submitted, an Issues Management (IM) will be initiated in accordance with P322-4, *Issues Management*.
- Extension is not approved until DOE approves it



# Active

Website for  
RWMB  
information  
and status

Environment / Waste Support / Certification / RWMB

## Radioactive Waste Management Basis

This page contains CUI or links to CUI

### Approvals

DOE approval of the LANL Radioactive Management Waste Basis (RWMB) to continue facility operations is performed by section. Each FOD or project section of the submittal will be reviewed and approved independently.

### Current RWMBs

Archive: 2015 through 2021

Archive: 2007 through 2014

#### LANSCE

- [LANSCE \(pdf\)](#) (expires April 1, 2022)
  - [LANSCE Extension 2 \(pdf\)](#) (expires March 31, 2022)

#### STO

- [STO \(pdf\)](#) (expires January 31, 2023)
  - [STO Extension \(pdf\)](#) April 5, 2021 (expires February 4, 2022)
  - [STO Extension 2 \(pdf\)](#) May 12, 2021 (expires April 30, 2022)
  - [STO Extension 3 \(pdf\)](#) July 26, 2021 (expires July 31, 2022)

#### TA-55

- [TA-55 CMR Extension \(pdf\)](#) May 12, 2021 (expires March 31, 2022)
- [TA-55 CMR \(pdf\)](#) (expires December 24, 2022)

### Contacts

*DOE O 435.1 RWMB Lead*  
[Colleen Martinez](#)  
[EPC-WMP](#)

### Status & Annual Reviews

#### Status

- [RWMB Status \(pdf\)](#)
- [RWMB Extensions Status \(pdf\)](#)

#### Annual Reviews

- [2020 RWMB Annual Review \(pdf\)](#)
- [2019 RWMB Annual Review \(pdf\)](#)
- [2018 RWMB Annual Review \(pdf\)](#)
- [2017 RWMB Annual Review \(pdf\)](#)



# Related DOE Orders – 422.1 ConOps

- DOE O 422.1 **Conduct of Operations**

- Includes 18  
“Attachments”

**U.S. Department of Energy**  
Washington, D.C.

**ORDER**

**DOE O 422.1**

Approved: 6-29-2010

Chg 1: 6-25-2013

Chg 2: 12-3-2014

Certified: 12-3-2014

**SUBJECT: CONDUCT OF OPERATIONS**

1. PURPOSE. The objective of this Order is to define the requirements for establishing and implementing Conduct of Operations Programs at Department of Energy (DOE), including National Nuclear Security Administration (NNSA), facilities and projects. A Conduct of Operations Program consists of formal documentation, practices, and actions implementing disciplined and structured operations that support mission success and promote worker, public, and environmental protection. The goal is to minimize the likelihood and consequences of human fallibility or technical and organizational system failures. Conduct of Operations is one of the safety management programs recognized in the Nuclear Safety Rule Title 10 Code of Federal Regulations (CFR) Part 830, Nuclear

# Related DOE Orders – 422.1 ConOps

- DOE O 422.1 **Conduct of Operations**

- Includes 18  
“Attachments”

1. Operations Orgs and Administration	7. Notification	13. Control of Interrelated Process
2. Shift Routines and Operating Practices	8. Control of Equipment and System Status	14. Required Reading
3. Control Room Activities	9. Lockout and Tagout	15. Timely Orders to Operators
4. Communications	10. Independent Verification	16. Technical Procedures
5. Control of On-Shift Training	11. Log keeping	17. Operator Aid Postings
6. Investigation of Abnormal Events	12. Operations Turnover	18. Equipment and Piping Labeling



# Related DOE Orders – 414.1D

- DOE O 414.1D **Quality Assurance**
  - Purpose

**U.S. Department of Energy**  
**Washington, D.C.**

**ORDER**

**DOE O 414.1D**

Approved: 4-25-2011

**SUBJECT: QUALITY ASSURANCE**

1. PURPOSE.

- To ensure that Department of Energy (DOE), including National Nuclear Security Administration (NNSA), products and services meet or exceed customers' requirements and expectations.
- To achieve quality for all work based upon the following principles:
  - (1) All work, as defined in this Order, is conducted through an integrated and effective management system;

# Related DOE Orders – 414.1D

1.

## PURPOSE.

- a. To ensure that Department of Energy (DOE), including National Nuclear Security Administration (NNSA), products and services meet or exceed customers' requirements and expectations.
- b. To achieve quality for all work based upon the following principles:
  - (1) All work, as defined in this Order, is conducted through an integrated and effective management system:  
minimized while maximizing reliability and performance of work products.
- c. To establish additional process-specific quality requirements to be implemented under a Quality Assurance Program (QAP) for the control of suspect/counterfeit items (S/CIs), and nuclear safety software as defined in this Order.

# State Drivers

- New Mexico Hazardous Waste Act
- New Mexico Administrative Code, 20 NMAC 9.8
- LANL Hazardous Waste Facility Permit



**TITLE 20  
CHAPTER 9  
PART 8**

**ENVIRONMENTAL PROTECTION  
SOLID WASTE  
SPECIAL WASTE REQUIREMENTS**

**NM  
Special  
Waste**

**20.9.8.1**

**ISSUING AGENCY.** New Mexico Environmental Improvement Board.  
[20.9.8.1 NMAC - Rp, 20 NMAC 9.1.I.001, 8/2/2007]

**SCOPE.** This part applies to the transportation, storage, transfer, processing, trading, composting, nuisance abatement and disposal of solid waste.  
[20.9.8.1 NMAC - Rp, 20 NMAC 9.1.I.002, 8/2/2007]

Los Alamos National Laboratory  
Hazardous Waste Permit  
June 2020

## PART 1: GENERAL PERMIT CONDITIONS

### 1.1 AUTHORITY

This Permit is issued pursuant to the authority of the New Mexico Environment Department (Department) under the New Mexico Hazardous Waste Act (HWA), NMSA 1978, §§ 74-4-1 through 74-4-14, in accordance with the New Mexico Hazardous Waste Management Regulations (HWMR), 20.4.1 NMAC.

Pursuant to the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901 to 6992k, and 40 CFR Part 271 and Part 272 Subpart GG, the State of New Mexico, through the Department, is authorized to administer and enforce the state hazardous waste management program under the HWA in lieu of the federal program.



# New Mexico Hazardous Waste Act (NMHWA or HWA)

- The NMHWA is implemented through the state's hazardous waste regulations found in Title 20 of the New Mexico Administrative Code Part 4.1 (20 NMAC 4.1). The NMHWA adopts regulations set forth under RCRA or imposes more stringent regulations and governs the management of hazardous and mixed wastes, including wastes generated at LANL

**Note:** *The New Mexico Environment Department (NMED) is authorized by the EPA to implement and enforce RCRA regulations in the State of New Mexico.*



# NM Special Waste

- A solid waste with unique handling, transportation, or disposal requirements to assure protection of the environment, and the public health, welfare and safety; including
  - treated formerly characteristic hazardous wastes (TFCH);
  - regulated asbestos waste
  - ash
  - sludge
  - spill of a chemical substance or commercial product...
  - Petroleum contaminated soil (PCS)
  - infectious waste

NEW MEXICO SPECIAL WASTE Los Alamos National Laboratory P.O. Box 1663, Los Alamos, NM 87545			
<b>CONTENTS</b>			
<input type="checkbox"/> Asbestos	<input type="checkbox"/> Infectious Waste	<input type="checkbox"/> TFCH Waste	<input type="checkbox"/> Industrial Waste
<input type="checkbox"/> Petroleum Contaminated soil	<input type="checkbox"/> Spilled chemical/ Commercial product		
<input type="checkbox"/> Ash	<input type="checkbox"/> Sanitary Sludge	<input type="checkbox"/> Other _____	
<b>HAZARDS</b>			
<input type="checkbox"/> Dermal	<input type="checkbox"/> Ingestion	<input type="checkbox"/> Inhalation	
<input type="checkbox"/> Other _____			
<b>Generator</b>		<b>Phone</b>	
_____		_____	
<b>Date placed into Storage</b>			
<b>Awaiting Transportation</b> _____			

# LANL Hazardous Waste Facility Permit

- RCRA and state regulations require that LANL have a permit to operate TSFs. LANL's Hazardous Waste Facility Permit, issued through NMED, identifies standards for facility operation, including administrative standards and technical standards.
- The first permit, which was issued in November 1989, is renewed every 10 years. LANL's current permit was signed in November 2010 although **an updated permit was submitted in 2020 and is pending approval.**
- LANL must meet the conditions of the permit or be subject to fines, penalties, and/or notices of violation (NOVs).





## 2.12.2 Facility Operating Record

The Permittees shall maintain a written Facility Operating Record for the operations of each permitted unit at the Facility until the Department has approved either the closure certification statement or, if the unit enters post-closure care, the post-closure certification statement with respect to such unit as specified in Permit Sections 9.5 and 10.2.3 respectively (see 20.4.1.500 and 501 NMAC). For documents that address the entire Facility (e.g., certifications of a Facility program to reduce the volume and toxicity of hazardous waste), the Permittees shall maintain these documents throughout the active life of the Facility including the post-closure care period.

Unless specifically prohibited by this Permit, an electronic record in accordance with 40 CFR § 270.32(b)(2) shall be maintained and made available to the Department and capable of producing a paper copy shall be documented (see 40 CFR § 270.32(b)(2)). Any substantive alterations made to the record shall be documented, dated, and made part of the Facility Operating Record.



# Required Content of the Facility Operating Record

- The Permittees shall incorporate, as soon as it becomes available, into the Facility Operating Record the following information:
  - There are **18 items** listed as follows:

## Take away:

There is a LOT required for the  
Facility Operating Record!



(1) a description of the hazardous waste received and the methods and dates of treatment and storage at each permitted unit in accordance with Appendix I of 40 CFR Part 264, which is incorporated herein by reference;	(10) for treated wastes, the information contained in the notice and certification required under 40 CFR § 268.7(b), which is incorporated herein by reference;
(2) the location of each type of hazardous waste within each permitted unit and the total quantity of all wastes and waste types at each unit (the location shall be identified as one of the permitted units listed in Attachment J ( <i>Hazardous Waste Management Units</i> ) and any associated structure (e.g., room, dome));	(11) if applicable, for hazardous wastes left in the ground after closure (i.e., disposal units), the information required of a treatment facility under 40 CFR § 268.7(b), which is incorporated herein by reference;
(3) records and results of waste analyses and waste determinations that are performed pursuant to Permit Section 2.4, Attachment C ( <i>Waste Analysis Plan</i> ), and 40 CFR §§ 264.1083, 268.7, and 268.9, which are incorporated herein by reference;	(12) for stored wastes, the notice (or information contained in the notice for wastes generated on-site) and certification required at 40 CFR § 268.7, which is incorporated herein by reference;
(4) incident reports and details of all incidents that required the implementation of Attachment D ( <i>Contingency Plan</i> ), any instance of fire, explosion, spill, or release from, or at, a permitted unit regardless of whether the incident required implementation of the Contingency Plan or Permit Part 11 (see 40 CFR § 270.32(b)(2));	(13) all monitoring reports and records required by this Permit, including but not limited to: <ul style="list-style-type: none"> <li>a. records of all monitoring data used to complete Permit Application(s);</li> <li>b. all data gathered or generated during the closure or post-closure process;</li> <li>c. all laboratory reports, drilling logs, bench-scale or pilot scale data;</li> </ul>
(5) records and results of inspections as required in Permit Section 2.6 and Attachment E ( <i>Inspection Plan</i> );	(14) documentation demonstrating distribution of the Contingency Plan in accordance with Permit Section 2.11.3;
(6) monitoring, testing, analytical data, and response actions when required by 40 CFR §§ 264.191, 264.193, 264.195, 264.602, 264.1063(d) through 264.1063(i), 264.1064, and 264.1082 through 264.1090, which are incorporated herein by reference;	(15) documentation demonstrating the installation and maintenance of secondary containment system coatings or sealants as required at Permit Section 3.7.1(4) and 4.4(4);
(7) notices to off-site generators as specified in 40 CFR § 264.12(b), which is incorporated herein by reference;	(16) personnel training records including both introductory and continuing training programs used to prepare employees to safely operate and maintain a permitted unit in compliance with 40 CFR § 264.16(d), which is incorporated herein by reference, and this Permit;
(8) (reserved);	(17) documentation of notifications and trainings associated with alternate emergency equipment as required at Permit Section 2.10.2; and
(9) an annual certification stating a Facility program is in place to reduce the volume and toxicity of hazardous waste generated;	(18) documentation of all instances where an indoor fire suppression system has been activated resulting in fire suppressants contacting a waste storage pad.

# Internal Drivers

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- Triad/DOE Contract (“**Prime Contract**”)
- LANL Policies and Procedures

internal

# Triad/DOE Contract

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- Triad operates LANL for the NNSA under a contract with the DOE. The Triad/DOE contract includes environmental compliance measures pertaining to
  - environmental restoration (ER) and waste management
  - environment, safety, and health
  - waste minimization/pollution prevention
- DOE performs annual evaluations to assess LANL's progress in meeting the performance measures stated in the Triad/DOE contract. Failure to meet these measures could jeopardize contract renewal

internal

# LANL Policies and Procedures

- LANL has written requirements to carry out the federal and state laws that apply to hazardous, radioactive, and mixed wastes. Mandatory requirements, as well as requirements suggested by DOE, are documented in the Triad/DOE contract. LANL's documentation structure consists of:

- Triad/DOE contract
- Governing policies
- System descriptions
- Program descriptions
- Procedures
- Requirements
- Notices
- Other institutional documents

**FSD** – Functional Series Document

**RD** – Requirements Document

**IG** – Instructional Guideline

**TP** – Technical Procedure

**AP** – Administrative Procedure

Types of  
supporting  
documents  
referenced in P409

internal



# LANL Policies and Procedures

LANL procedures that impact waste management operations include

Requirement	Title
P409	<i>LANL Waste Management - and supporting documents (FSDs and IGs)</i>
P101-14	<i>Chemical Management</i>
P409-1	<i>LANL Waste Acceptance Criteria (replaces P930-1)</i>

**Note:** *LANL institutional documents are subject to revision, new documents are added, and old documents are deleted regularly. For the latest updates of LANL policies, click on the Top Tools/Policies link on the LANL homepage.*



**NOTE 2:** *All waste generated at LANL is regulated*

# Consequences of Non Compliance

- LANL policy documents require compliance with applicable regulations. Waste generators are liable for noncompliance with environmental regulatory requirements.

**Both Triad and  
individuals  
personally can be  
held accountable**



may include

- leave without pay,
- termination, and/or
- written or oral reprimand.

- may result in fines (possibly retroactive) and penalties up to
  - \$27,500/day per violation or
  - \$50,000/day per violation for chronic violations and
- can include
  - loss of permits required to operate or
  - shutdown of operations.

## • Consequences:

- Disciplinary Action
- Civil Violations
- Criminal Violations
- Administrative Action

are classified based on

- intentional violations;
- inadequate supervision of employees committing intentional violations; or
- intentional failure to perform corrective action for violations, which can result in
  - fines and penalties up to \$50,000/day and/or
  - 2 years in prison; and

can include

- loss of permits required to operate or
- shutdown of operations.

*Fines and penalties may be retroactive and are nonallowable costs that must be paid out of the Triad fund for the operation of LANL*

can include

- loss of permits required to operate or
- shutdown of operations.

# Waste Acceptance Criteria (WAC)

- Very common...
- Even we have one

**Procedure**

Los Alamos National Laboratory

**No: P409-1**

Revision: 2

Issued: 12/19/18

Effective Date: 01/23/19

**LANL Waste Acceptance Criteria**

**Table of Contents**

# The LANL WAC

- The **purpose(s)** of the LANL WAC

## LANL Waste Acceptance Criteria

### 1.0 PURPOSE

- 1 This document describes, by waste type (non-hazardous, low-level, mixed low-level, transuranic [TRU], mixed TRU), the facilities and the conditions under which waste is received and managed at Treatment and Storage Facilities (TSFs) at Los Alamos National Laboratory (LANL or the
- 2 Laboratory). The requirements and limitations for waste storage at LANL or preparation for off-site disposal are provided to facilitate waste treatment and storage as documented in P409, *LANL Waste Management*, or the P409 Functional Series Documents (*Instructional Guidance or*
- 3 *Requirement Tools*). A current list of Resource Conservation and Recovery Act- (RCRA-) permitted facilities and their requirements can be found in the LANL Hazardous Waste Facility Permit Attachment J.



# Module 2: Summary

- Drivers
    - Federal
    - State
    - Internal
  - RCRA
  - HSWA
  - TSCA
  - HMTA
  - DOE Orders
    - NMHWA – or – HWA
    - NMSW
    - HWF Permit
      - Facility Operating Record
  - LANL / DOE Contract
  - LANL Policies and Procedures
- 
- ```
graph LR; Drivers[Drivers] --- Federal[Federal]; Drivers --- State[State]; Drivers --- Internal[Internal]; Federal --- RCRA[RCRA]; Federal --- HSWA[HSWA]; Federal --- TSCA[TSCA]; Federal --- HMTA[HMTA]; State --- NMHWA[NMHWA – or – HWA]; State --- NMSW[NMSW]; State --- HWF[HWF Permit]; HWF --- FOPR[Facility Operating Record]; Internal --- LANLContract[LANL / DOE Contract]; Internal --- LANLPolicies[LANL Policies and Procedures];
```

# Module 2: Summary

---

- Consequences of non-compliance
  - LANL WAC
- 
- Disciplinary Action
  - Civil Violations
  - Criminal Violations
  - Administrative Action

# Enabling Objectives

---

- Identify regulatory drivers associated with waste management at LANL
- Recognize the regulatory agencies involved in waste activities at LANL
- Identify where waste-regulating agencies get their authority
- Recognize principles related to hazardous waste regulations
- Recognize the consequence of non-compliance to waste management requirements





# Module 3: Waste Planning

Waste Management Fundamentals  
for Environmental Professionals

UTrain: 50448

Revision 0; Aug. 2021



# The Modules

- 1: ~~Intro to Waste~~ ✓
- 2: ~~Waste Regulations and Requirements~~ ✓
- 3: **Waste Planning**
- 4: Waste Generation and Tracking
- 5: Waste Characterization
- 6: Waste Packaging
- 7: Waste Accumulation and Storage
- 8: Waste Treatment
- 9: Waste Shipping
- 10: Operating Experience and Lessons Learned

**YOU**  
*are*  
**HERE**

# Topics

- Waste Forecast
- Integrated Review Tool/PRID/EXID
- Difficult/No-Path Waste
- Resources/Budget





# Module 3: Enabling Objectives

---

- Describe the purpose of a waste forecast
- Identify the factors that go into a waste forecast
- Describe the use of an integrated review tool/PRID/EXID
- Recognize the attributes of “difficult/no-path waste”
- Identify the options for difficult/no-path waste
- Recognize the influence of budget on waste operations



# Waste Forecast - Purpose

- Forecast annual generation rate for each waste type;
- Identify projects or activities that may generate large waste volumes or difficult to manage waste;
- Determine space, resources, and personnel needs for managing waste;
- Identify opportunities for pollution prevention and waste minimization
- Ensure lifecycle budget planning that includes disposition of all waste at project or activity termination.

**WHY  
DO WE  
DO IT ...**

# Roles and Responsibilities

## Waste Generator

- Use the **Integrated Project Review** process to identify potential waste generating activities
- Complete the **annual waste forecast**
- **Engage your assigned WMC** early in the planning process for any potential waste generating activity
- Incorporate waste generation in **budget and schedule planning**
- Conduct **waste avoidance or minimization analysis** in consultation with the WMC and EPC-ES before waste is generated
- **Provide resources** for developing and implementing storage and disposition paths for waste generation

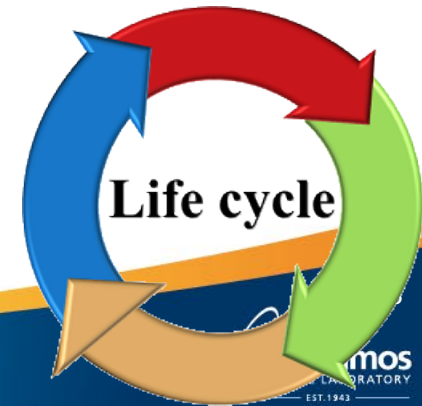
# Roles and Responsibilities (Continued)

## Waste Management Coordinator (WMC)

- **Assist waste generators** in identifying waste generating activities and waste types
- **Notify and engage your RLM** if a potential difficult or no path waste may be generated in accordance with the **Difficult Waste** procedure, AP-P409-0101
- Assist waste generators in **forecasting and budgeting** for waste generation in accordance with **Waste Planning**, FSD-P409-0100
- Ensure waste items and containers are entered and tracked in **WCATS**

# Lifecycle Planning

- **Multiple Laboratory documents (SD355, SD400, P351) require lifecycle planning for activities and projects.**
  - Waste generation and disposition must be incorporated into that planning.
  - Each waste type (e.g., LLW, NMSW, MTRU) has different regulatory, storage, and disposition requirements
  - WMCs should be engaged early in the planning process to be most effective with identifying waste minimization opportunities and potential difficult waste issues



# Waste Forecast

- Development of a comprehensive LANL waste forecast:
  - supports waste life cycle planning
  - resource allocation
  - waste minimization
  - and meets the NNSA requirement to provide a 5-year forecast and budget projection





# Waste Forecast

- Identify changes in baseline (routine) waste generation by waste type
- Identify special project (one-time generation) wastes that may impact waste planning/resources
- Identify Difficult/No path waste
- Budget planning including waste subcontracts
- Waste storage and shipment planning
- Future waste management facility needs
- Respond to internal/external waste management data requests



# Waste Forecast

- Request forecast update third quarter of each FY
- Last 5 years of WCATS generation data provided
- Provide 5 year projection of volumes by waste type
- Enter forecast into Excel spreadsheet
- In the future forecast will be entered/updated directly in WCATS



# Waste Forecast

## GENERAL INFORMATION

- ORGANIZATION
- DATE

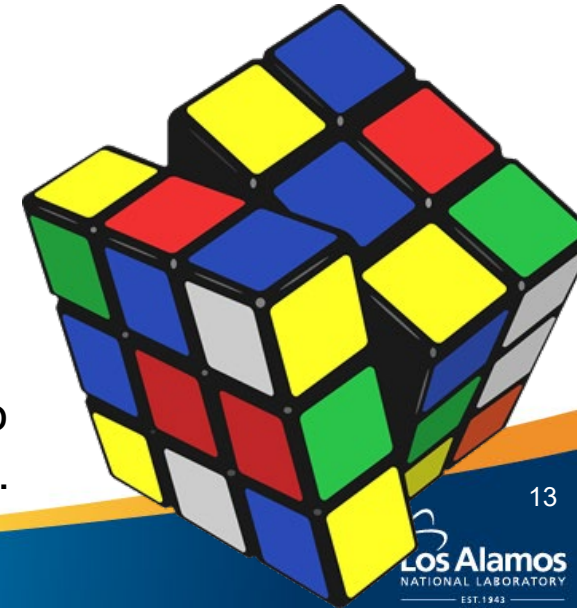
## WASTE DATA

- WASTE TYPE – TRU, MTRU, LLW, MLLW, HW, UNIVERSAL, TSCA, NMSW, INDUSTRIAL
- ROUTINE OR SPECIAL PROJECT (ONE-TIME GENERATION)
- DIFFICULT OR NO PATH TO DISPOSAL WASTE – E.G., HIGH ACTIVITY, SIZE REDUCTION, REACTIVE
- VOLUME IN CUBIC METERS (M3) ANNUALLY
  - NEXT 5 YEARS
- POINT OF CONTACT – FOR EACH WASTE TYPE

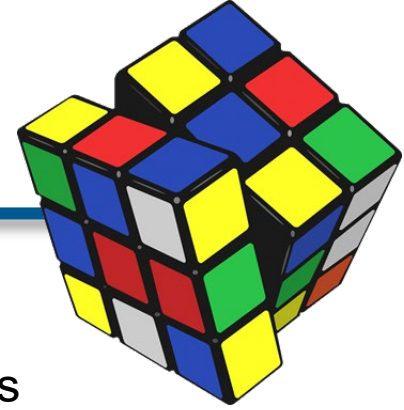


# Difficult Waste

- Any waste stream that presents challenges severe enough to prevent timely disposition of the waste. The waste may require development of additional capabilities for transport, treatment, and/or disposition due to one or more of the following issues:
  - High radioactivity or dose;
  - Radioactive gas;
  - Radioactive sources;
  - Classified shapes or materials;
  - Explosives contamination;
  - Container integrity issues from waste content due to unknown causes, gas generation, bulging, heat, etc.



# Difficult Waste



## ...Issues, Continued:

- Requirement for permitted treatment prior to off-site shipment when that treatment is not currently included in the Laboratory's Hazardous Waste Facility Permit; and
- Presence of a condition or contaminant is not easily remedied and that prevents the waste from meeting an off-site facility's WAC.
- Some items are difficult wastes due to **logistical issues** with size, weight or lack of an appropriate Department of Transportation (DOT) shipping container or when traceability between the waste and the generator is lost
- Difficult waste should be **identified during planning prior to generation**
- Follow process in AP-P409-0101, *Difficult Waste Streams*
- WM-DO will assign **SMEs to assist** with disposition

# No Path For Disposal Waste

- DOE M 435.1-1, *Radioactive Waste Management Manual*, requires DOE approval prior to generating TRU/MTRU or LLW/MLLW waste streams with no disposal path
- P409, *LANL Waste Management* requires that waste planning include waste characterization prior to generation and requires pre-authorization if waste with no disposal path must be generated.
- *Must demonstrate programmatic need to generate the waste*



# Integrated Project Review

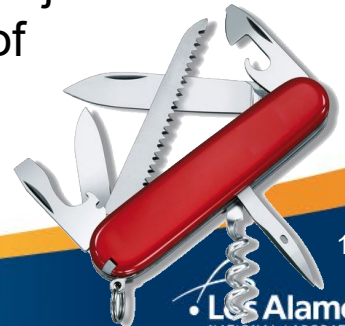
- SD400, ***Environmental Management System***, requires all new and modified work, activities, operations, and projects, including changes in scope or location, to be reviewed for applicable environmental requirements through the **Integrated Review Tool (IRT)**
- P351, ***Integrated Review Tool and Permits and Requirements Identification*** is the portal to project review tools including Permits and Requirements Identification (**PRID**), Excavation/Fill/Soil Disturbance (**EXID**) (P101-17, **Excavation/Fill/Soil Disturbance**), and Major and Minor Siting (P941, **Site Planning**).





# Integrated Project Review Tool (IRT)

- SD400 provides the criteria for when the IRT is required in Attachment C. *Criteria for New and Modified Activities and Projects Required to Use the Integrated Review Tool.*
- WMC should be engaged in the IRT process
- Activities, operations, and projects that meet one or more of the following criteria are required to use the Integrated Review Tool:
  1. relocation or expansion of existing activities, operations, and projects (e.g., relocation of sheds, trailers, or transportainers; expansion of on-going operations in the same building; movement of an operation or activity to a different building or technical area);



# IRT Criteria (continued)

2. new, expanded, or relocated research and development activities (e.g., installation of new accelerator, increased pit production);
3. new construction (e.g., new shed, trailer or transportainer installation; temporary or permanent laydown yards, storage yards, and parking lots);
4. facility upgrades and/or modifications (e.g., re-configuration of laboratory space; replacement and/or upgrades to heating, ventilation, and air condition [HVAC] systems; boilers; tank installation; paving);
5. expense funded construction activities (e.g., some roof replacement, facility modifications, and/or facility refurbishment);



# IRT Criteria (continued)

- 6. facility shutdown, decommissioning, demolition, and/or decontamination (e.g., removal/disposal of transportainers, footprint reduction activities, facility status changes from active to “cold and dark,” disposal of refrigeration equipment)
- 7. outdoor activities and modification of land use (e.g., new roads, parking areas, tree thinning, mowing, road maintenance and improvement).



# Pollution Prevention (P2)

- After identifying potential waste types the first consideration should be:

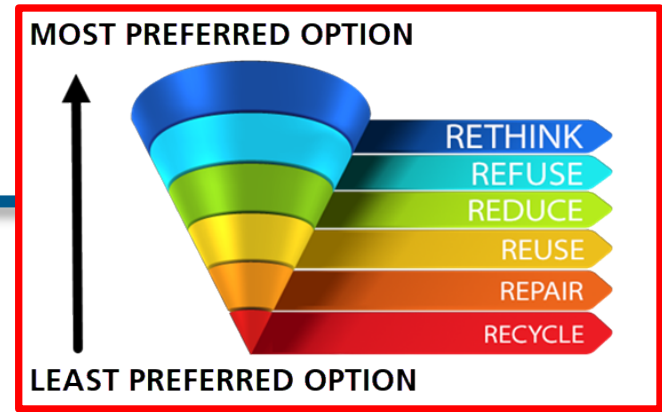
*“How can the waste be avoided or minimized”*

- Substitute less hazardous materials if possible
- Segregate hazardous and radioactive waste from non-contaminated wastes
- Minimize volume through size reduction and efficient packaging



## P2 Hierarchy

- **RETHINK:** Invent sustainable solutions
- **REFUSE:** Say no to single-use items.
- **REDUCE:** Minimize waste.
- **REUSE:** Purchase multiple-use items.
- **REPAIR:** Fix broken items.
- **RECYCLE:** Follow local guidelines.



# P2 Tools

- [Clean Fill Management](https://int.lanl.gov/environment/p2/clean_fill.shtml) (https://int.lanl.gov/environment/p2/clean\_fill.shtml)
- [Environmental Outreach Checklist \(pdf\)](https://int.lanl.gov/environment/_assets/docs/environmental-outreach-checklist.pdf)  
(https://int.lanl.gov/environment/\_assets/docs/environmental-outreach-checklist.pdf )
- [Environmental Tools](https://int.lanl.gov/environment/index.shtml) (https://int.lanl.gov/environment/index.shtml)
- [Going Paperless at the Lab \(pdf\)](https://int.lanl.gov/environment/p2/_assets/documents/LA-UR-18-23457-going-paperless-at-LANL.pdf)  
(https://int.lanl.gov/environment/p2/\_assets/documents/LA-UR-18-23457-going-paperless-at-LANL.pdf )
- [Green is Clean](https://int.lanl.gov/environment/waste/green-is-clean.shtml) (https://int.lanl.gov/environment/waste/green-is-clean.shtml)
- [Posters, Awareness Tools](https://int.lanl.gov/environment/tools.shtml) (https://int.lanl.gov/environment/tools.shtml)

# P2 Resources

- Contact EPC-ES P2 Team [p2program@lanl.gov](mailto:p2program@lanl.gov)
- P2 and Sustainability webpage:  
<https://int.lanl.gov/environment/p2/index.shtml>

- P2 checklists
  - LLW/MLLW
  - Hazardous Waste
  - Industrial and Radioactive Liquid Waste
  - Sanitary Waste

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Environment / Pollution Prevention & Sustainability Support

## Pollution Prevention & Sustainability Support

**SOURCE REDUCTION HIERARCHY**

**SOURCE REDUCTION** is the elimination of **waste** before it is created.

- **RETHINK**: Invent sustainable solutions.
- **REFUSE**: Say no to single-use items.
- **REDUCE**: Minimize waste.
- **REUSE**: Purchase multiple-use items.
- **REPAIR**: Fix broken items.
- **RECYCLE**: Follow local guidelines.

**SUBJECT MATTER EXPERTS**

- P2 Program Lead  
Kassidy Boorman
- Team Leader  
Terry Foecke

**NEED HELP?**

- Deployed Environmental Professionals
- Designated Purchase Representatives
- Directives (ENM500's (pdf))

**P2 TOOLS**

- Chemical Alternatives
- Clean Fill Management
- Environmental Outreach Checklist (pdf)
- Environmental Tools

**ON OUR PUBLIC WEBSITE**

- P2 Awards Journey
- Sustainability Goals



# Waste Compliance and Tracking System (WCATS)

---

- WCATS is an integral part of the lifecycle process for effective waste management. Data collected in WCATS provides useful information for resource optimization and helps identify trends in waste generation
- software application specifically designed to manage LANL waste from cradle to grave
- system provides support for characterization, generation, storage, and shipment of all waste created at LANL
- maintains record of historical waste generation



*The future of waste operations at LANL.*

# WCATS Data & Reports

---

- to be an effective waste lifecycle management tool data must be **entered accurately and in a timely manner**
- As part of the waste stream profile process both new and revised profiles are required to have an **estimate of waste volume to be generated**
- produces both **standardized reports** and can generate **custom reports** to aid in both strategic planning and efficient day to day management of waste
- request a report by contacting [WasteHelp@lanl.gov](mailto:WasteHelp@lanl.gov)

# Budget & Resource Planning

- Most activities at LANL generate regulated waste therefore waste generation must be incorporated into the budget and schedule process
- Consider ALL resources necessary to support waste activities including characterization, appropriate containers, storage space and trained personnel.
- Include budget for project/activity closeout – disposition of remaining equipment and materials that may become waste



# Resources

- Assigned WMC will engage other waste and regulatory SMEs to determine needs and requirements
- Waste Management Services (WM-WMS) maintains LANL transportation, treatment and disposal contracts and can assist with estimating disposition cost for waste
- Environmental Services (EPC-ES) provides NDA and sampling services and can assist with characterization



# Module 3: Summary



- **Waste Forecast**

- 5-year forecast - annual update

- **Integrated Review Tool/PRID/EXID**

- required for most projects/activities – **waste must be included**



- **Difficult/No-Path Waste**

- Identify early, get help



- **Budget/Resources**

- include all resources needed and plan for end of project



# Module 3: Enabling Objectives

---

- Describe the purpose of a waste forecast
- Identify the factors that go into a waste forecast
- Describe the use of an integrated review tool/PRID/EXID
- Recognize the attributes of “difficult/no-path waste”
- Identify the options for difficult/no-path waste
- Recognize the influence of budget on waste operations





# Module 4: Waste Generation and Tracking

Waste Management Fundamentals  
for Environmental Professionals

UTrain: 50448

Revision 0; Aug. 2021





# The Modules

- 1: ~~Intro to Waste~~ ✓
- 2: ~~Waste Regulations and Requirements~~ ✓
- 3: ~~Waste Planning~~ ✓
- 4: **Waste Generation and Tracking**
- 5: Waste Characterization
- 6: Waste Packaging
- 7: Waste Accumulation and Storage
- 8: Waste Treatment
- 9: Waste Shipping
- 10: Operating Experience and Lessons Learned

**YOU**  
*are*  
**HERE**

# Enabling Objectives

---

- Identify responsibilities of Waste Generators at LANL
- Recognize the “Point of Generation” for waste
- Identify capabilities and functions of LANL’s WCATS



# Waste Generator

- Within the Laboratory, anyone who throws material away, destroys it, releases it into the environment, or decides that it is not going to be used is a **waste generator**.
  - The individuals making these decisions are normally **process personnel** and/or front line managers who are closest to the work activity. They are individuals who are actively engaged in or are actively overseeing waste generating work activities.
  - For work that is being subcontracted, it is the responsibility of the requesting manager, Project Manager, and Subcontract Technical Representative to identify and assign the Waste Generator role to the appropriate LANL process personnel.

*Typically process personnel hold titles such as supervisors, workers, Project Managers, Construction Managers, Maintenance Managers, Team Leaders, program leaders, researchers, chemical owners, and Principal Investigators.*

# Waste Generator Requirements

Red text: where  
discussed in P409

- Plan their work and how they are going to manage the waste (Sect. 3.1)
- Characterize their waste by providing accurate descriptions of the chemical, radiological, biological, security, and physical attributes of the waste and by providing a detailed and accurate description of the process that created the waste (Sect. 3.3)
- Make a documented waste determination at the point of generation prior to diluting, mixing, or otherwise altering the waste (Sect. 3.4)
- Follow WMC or NPI directions to properly package and label their waste (Sect. 3.5)
- Follow WMC or NPI directions to properly store their waste (Sect. 3.6)
- Maintain their training (Sect. 6.0)



# Point of Generation

- When does something become a waste? In the regulations, a material becomes a waste at the “**point of generation**”
  - process personnel must make a waste determination at the point of generation *before any dilution, mixing, or alteration of the waste occurs.*
  - To ensure this important point is clear to all, P409 lists **specific examples** of point of generation (shown on the next slides)



# Point of Generation Examples

- Whenever something gets discharged to a wastewater treatment facility (such as LANL's Sanitary Wastewater System or the Radioactive Liquid Waste Treatment Facility);
- When the material becomes "spent" and can no longer be used for its intended purpose without reprocessing it;
- When a decision is made that a chemical or material cannot or will not be used for its intended purpose and will be discarded;
- When a treatment residue exits a treatment unit, including reject water from a water treatment unit;
- When a sludge is deposited in a container, tank, etc.;
- When a residue exits a unit that is otherwise exempt from waste regulations (such as a recycling unit or wastewater treatment unit);

# Point of Generation Examples (continued)

- When a solid waste is mixed with a listed hazardous waste, regardless of whether it was intentional or not;
- When a material has been spilled and is not recoverable for use;
- When construction or demolition is created by room or building construction, renovation, or demolition debris;
- When spent batteries or light bulbs are removed from service;
- When a material is abandoned (including abandonment in storage);
- When personnel leave the Laboratory or change positions and their materials are no longer needed; or
- When a decision is made that a nuclear material cannot or will not be recovered for reuse and will be discarded.



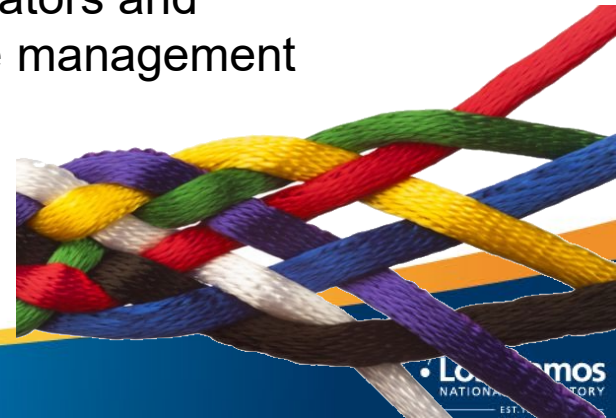
# Collaborative Waste Generation

- There are situations that involve more than one organization or individual in generating a waste. (P409; Section 3.2.4)
  - **Example 1:** process personnel determine that a material with special nuclear material is spent and is no longer usable. However, the material does not become a waste until after another organization performs tests to determine if the special nuclear material can be recovered.
  - ✓ In this instance, the process personnel and the personnel who review the additional data are co-waste generators and both groups are responsible for contributing to the waste characterization effort



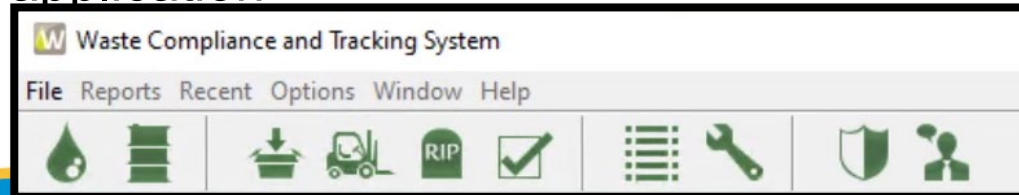
# Collaborative Waste Generation

- There are situations that involve more than one organization or individual in generating a waste. (P409; Section 3.2.4)
  - **Example 2:** Work may be subcontracted to an organization outside of LANL. This frequently occurs for construction, renovation, maintenance, or demolition projects.
    - ✓ In these instances, subcontracted process personnel and LANL subcontract oversight personnel are co-waste generators and contribute to waste characterization and other waste management activities.
    - ✓ In subcontracted work, LANL employees sign waste documentation as the owner and waste generator.



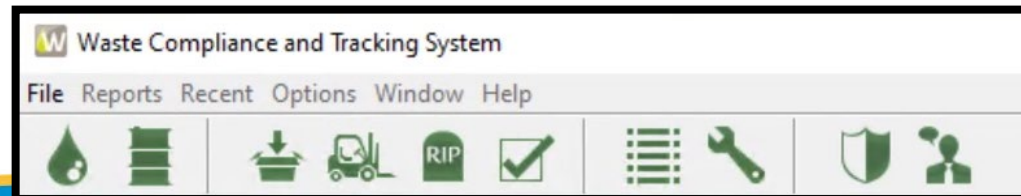
# WCATS Overview

- **Waste Compliance and Tracking System (WCATS)** is the official Operating Record for waste at LANL
  - Important to input and maintain accurate and complete information
- **Tracks waste from cradle to grave**
  - That's not easy as there are LOTS of variables associated with waste, waste processing, waste containers, etc. that need to be tracked
- WCATS itself has three different “environments”
  - Development, Beta, and Production
- Desktop application and mobile application
- WCATS interacts with UTrain



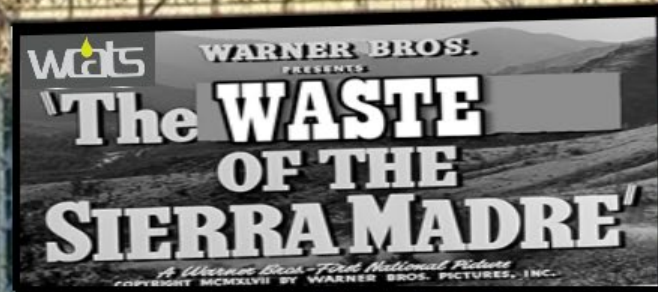
# WCATS Overview - continued

- WCATS is complex
  - It has to be to do what needs to be done
- The WCATS team provides many resources
  - Website with **User's Guide**, **training modules** (live classes, Webex, and online delivery) and **job aids**
  - WCATS help via email or phone
- Also, **Waste Information Reporting Application (WIRA)**
  - See the waste activities WCATS thinks you're involved with
  - Reporting capabilities



# WCATS Overview Video

- An overview
- Gives a taste
- What's available

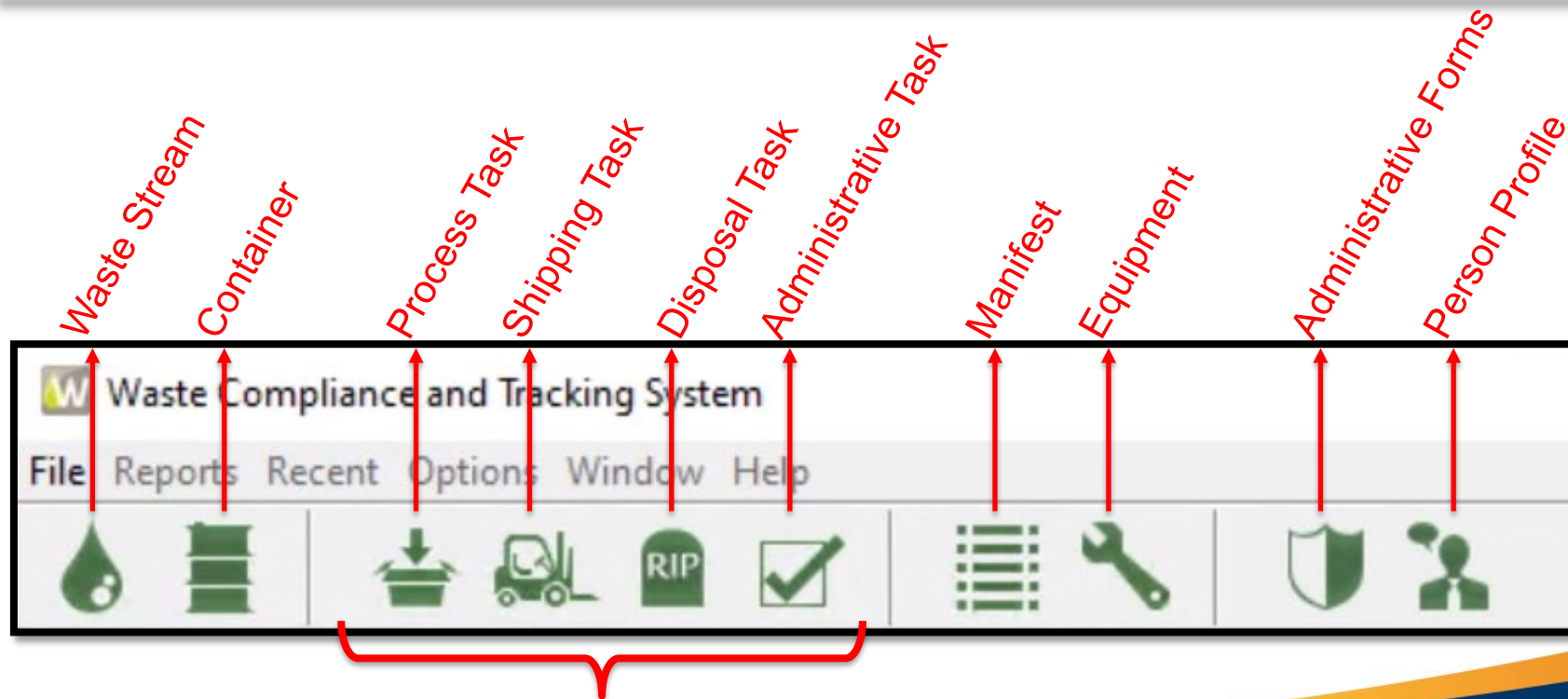


[Link to Video](#)





# Navigating in WCATS



# WCATS in General

- WCATS is a desktop application that can be used on both PCs and Mac computers
  - Non-wi-fi devices that can communicate with the system via a docking device while mobile devices can use wi-fi.
  - Information captured and maintained by WCATS is stored in a database.
- **WCATS supports the generation, characterization, processing, and shipment of LANL radioactive, hazardous, and industrial wastes.**
- WCATS includes a tool to create various reports





# Waste Documentation

---

- **History:**

- Before the implementation of WCATS, waste streams were documented using the waste profile form (WSP). Information formerly filled out on this form must now be entered into the WCATS database.

- **Today:**

- **Official waste documentation resides within the WCATS database**

- Generators who perform waste stream documentation must use WCATS (with assistance from WMCs)

# Waste Characterization and the Waste Stream Profile (WSP)

- Waste generators are responsible for providing a complete and accurate characterization of their waste.
  - Waste generators should make waste determinations for any solid waste generated (except exempt waste);
- **Complete a WSP (in WCATS) for each waste stream generated**
  - obtain and upload analytical data and/or acceptable knowledge (AK) documentation necessary and sufficient to support current, up-to-date, accurate, and complete characterization of the waste stream;
  - ...more...

# WSP Information in WCATS

- General Info
- Site Area
- Method of Characterization
- Documentation
- Waste Prevention / Minimization Info
- Chemical / Physical Information
- Waste Category
- Generator Estimates
- Annual Generation
- Process and Waste Description
- Ignitable / Corrosive / Reactive (I/C/R) Characteristics
- Toxicity Characteristics
- Compositions
- Additional Information
- Work Control Documentation
- Packaging/Storage Control Information
- Land Disposal Restriction (LDR) Info
- LDR Certifications
- Underlying Hazardous Waste Constituents (UHCs)
- Nuclides
- Waste Certification Statements
- Cost Codes
- Work Path
- Review – EPA Codes
- Review – Composition
- Review – Classification
- Signatures
- Containers
- Comment Log
- Edit Log

# WSP Training

WSPs must be reviewed annually by WG. They expire after 3 years but can be renewed.

- It's imperative that we get our Waste Characterization correct
  - It's also complicated and complex
- WSPs and WCATS training
  - There is a WMC WCATS course focused on creating and reviewing WSPs from a WMC perspective – detailed information and hands-on exercises
  - A separate WCATS WSPs intended for Waste Generators (course 8504) called “Waste Documentation”
- Additionally, **teamwork** and **mentoring** are often utilized out in the field



# Waste Management and WCATS Help

- **WMCs**

- **List of WMCs**

- [WMC-Help@lanl.gov](mailto:WMC-Help@lanl.gov)

- **RCRA Waste Guidance**

- <https://int.lanl.gov/environment/waste/guidance/rcra.shtml>

- **WCATS Help**

- Email: [wastehelp@lanl.gov](mailto:wastehelp@lanl.gov)

- Phone: 665-2494

Environment / Waste Support / Management / WMCs

## Waste Management Coordinators

What does a WMC do?

Waste Management Coordinators (WMCs) are the primary contact for waste-related issues. They coordinate and provide assistance with the storage, treatment, and disposal of hazardous waste, non-hazardous waste, biological waste streams, the characterization and classification of RCRA Waste and other types of solid and liquid waste, including other waste streams such as New Mexico Special Waste, Universal Waste, PCB Waste and Radioactive Waste. WMCs follow policies and procedures that are regulated under Federal and State laws for waste management operations. WMCs comply with LANL guidance procedures for Waste Management and Environmental Compliance.

Contacts

Waste Generator Services Group  
Leader  
Ronnie Garcia  
WGS Team Leader  
LFO/WFO/UT: Joseph B Rodriguez  
PM/Pipeline: David Schrock  
TA-55/STO: Steve Shelton  
Waste Questions? WMC-Help@lanl.gov

| Facility | TA    | Buildings                                        | Coordinator                                       |
|----------|-------|--------------------------------------------------|---------------------------------------------------|
| LFO      | TA-53 | All                                              | Kelsey Arcocha<br>Isaac Atencio                   |
| ALDP     |       |                                                  | Joseph A. Garcia<br>James Lopez                   |
| PM       |       | Project Management, Construction & Craft Support | Chris Martinez<br>Susan Thomas<br>Adrian Trujillo |

Waste Help

[wastehelp@lanl.gov](mailto:wastehelp@lanl.gov)

5-2494

"Our team supporting your team to move waste."

Environment / Waste Support / Guidance / RCRA

## RCRA Waste Guidance

| Solid, Hazardous, Mixed & Low-Level Waste                                                                                                                                                                                                                                                                                                                                                            | Radioactive & Special Waste                                                                                                                                                                                                                                                                                                                                                            | Contacts & Resources                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Aerosol Cans (pdf)</li><li>• Asbestos Disposal Guidance &amp; Requirements (pdf)</li><li>• Common RCRA Responsibilities for LANL Employees (pdf)</li><li>• Conducting Inspections of Federal Facilities for Compliance with RCRA Section 6002 (doc)</li><li>• Discarded Commercial Chemical Product</li><li>• Draeger Tubes at Savannah River Site</li></ul> | <p><b>Radioactive Waste</b></p> <ul style="list-style-type: none"><li>• Common Radioactive Waste Area Questions</li></ul> <p><b>Special Waste</b></p> <ul style="list-style-type: none"><li>• Oils that are <b>NOT</b> New Mexico Special Waste when they are spilled include:<ul style="list-style-type: none"><li>◦ renewable lubricants Bio-46</li><li>◦ Biosoy</li></ul></li></ul> | <p>EPC-WMP</p> <p><b>Resources</b></p> <ul style="list-style-type: none"><li>• LANL Regulations and Requirements</li><li>• Radioactive Registered Waste Areas</li><li>• Radioactive Waste Management Basis</li><li>• RCRA-specific Plans and Procedures</li></ul> <p><b>Site Accumulation Areas</b></p> |

# WCATS on the Web

LANLINSIDE

Search site

Environment / Waste Support / WCATS

## Waste Compliance and Tracking System



The Waste Compliance and Tracking System (WCATS) is a software application that has been specifically designed to manage LANL's waste from cradle to grave. The system provides the proper support needed for characterization, generation, processing, and shipment of all waste created at LANL.

[wcats.lanl.gov](http://wcats.lanl.gov)

Download the full [brochure \(pdf\)](#) for more information.

### User Support

- [Online WCATS User's Guide](#)
- [Training](#)

[Suggestions?](#) Tips and tricks

- [Keyboard shortcuts \(pdf\)](#)
- [Re-engineering updates](#)

### Area-focused Trifolds

- [Administrative Tasks \(pdf\)](#)
- [Cementation \(pdf\)](#)
- [Cement Set \(pdf\)](#)
- [General Guide \(pdf\)](#)
- [Generating Waste \(pdf\)](#)
- [Managing Equipment \(pdf\)](#)
- [Packaging Waste \(pdf\)](#)

### Related Links

- [ChemLog](#)
- [LIMS](#)
- [DOT](#)
- [RCRA](#)

### Contacts

*Project Lead*  
[Alex Baker](#)

*Software Developer Lead*  
[Seth Brown](#)

*Software Quality Management Specialist*  
[Tracy Oesterreicher Shaw](#)

*Customer Service Lead*  
[Scot Johnson](#)

### Waste Help

[wastehelp@lanl.gov](mailto:wastehelp@lanl.gov)

[5-2494](tel:5-2494)

# WCATS on the Web

## WCATS Training



The future of waste operations at LANL.

All WCATS training scheduled for March - July have been canceled due to LANL's policy on social distancing due to the COVID-19 pandemic. We will post any planned scheduled trainings as soon as we are given the okay to do so.

To all WCATS users:

We now have a [WCATS Training website](#) where many WCATS trainings can be completed **online**. Currently, the courses that can be completed online include the following:

|                                        |              |
|----------------------------------------|--------------|
| WCATS Introduction                     | Course 30853 |
| WCATS Inter-facility Shipments         | Course 35413 |
| WCATS Operations Center                | Course 29271 |
| WCATS Managing Equipment               | Course 35003 |
| <b>WCATS Refresher Admin. Training</b> | Course 47607 |

There are a lot of other WCATS training videos available on the website and we are still working on making more courses available online. Please check back often to see what is available.

If you have any questions regarding WCATS Training feel free to contact me or Jamey Cecil (505) 695-8611.

Have a great day!

Deb.

*Deborah Williams*

**WCATS**

**667-6520 (office)**

**695-8955 (cell)**

[dlwilliams@lanl.gov](mailto:dlwilliams@lanl.gov)

Links:

[WCATS Training Environment](#)

Training Questions:

For training questions or to request training not currently scheduled:

 [wastehelp@lanl.gov](mailto:wastehelp@lanl.gov)

 665-2494

**Trainers:**

Deborah Williams

 [dlwilliams@lanl.gov](mailto:dlwilliams@lanl.gov)

 667-6520

Jamey Cecil

 [jccecil@lanl.gov](mailto:jccecil@lanl.gov)

 667-5094



# WCATS User Guide

## Waste Compliance and Tracking System



<https://wcats.lanl.gov/wcats/>

manage LANL's waste from cradle to grave. The system provides the proper support needed for characterization, generation, processing, and shipment of all waste created at LANL.

### Announcements

**i** The classroom WCATS training have temporarily been postponed until June due to the requirement for social distancing. There have been some on-line training courses developed. Please visit the [WCATS Training website](#).

**i** Access the [WCATS User's Manual](#).

**i** Waste Stream Profiles that are currently limited to a lifespan of 5 years shall now be limited to 3 years. This has been approved by the SCB and is reflected in ADESH-AP-TOOL-118. WSPs that are currently in use for over 3 years can still be used until their expiration date.

**i** WCATS has launched a new Help Center to provide support to your requests. Visit the new WCATS Help Center at: [int.lanl.gov/wastehelp](http://int.lanl.gov/wastehelp). To speed up your requests, please visit the help portal and submit a [Help Request](#).

### WCATS Application

Launch WCATS

Web Reports

### Server Status

✓ All servers are operating normally

### Waste Help

[wastehelp@lanl.gov](mailto:wastehelp@lanl.gov)

5-2494

EPC-WMP-WCATS-GUIDE-002

Revision: 1

Effective Date: 10/22/2020

Next Review Date: 10/22/2023



Environment, Safety, Health, Quality, Safeguard, and Security Directorate  
Environmental Protection and Compliance Division  
Waste Management Programs Group

DE

## Waste Compliance and Tracking System (WCATS) User Guide

LA-UR-20-23289

Subject

Name:  
Baker

Organization:  
EPC-WMP

There's a LOT in here!  
• (> 500 pages)  
• Three sections

Reviewed by Derivative Classifier (Unclassified): ☒

Name:  
Daniel Gallegos

Organization:  
EPC-WMP

Signature:  
Signature on File

Date:  
10/21/2020

### Approval Signatures:

Name:  
Ol Torres

Organization:  
EPC-WMP

Signature:  
Signature on File

Date:  
10/21/2020

Team Leader:  
Ana Martinez

Organization:  
EPC-WMP

Signature:  
Signature on File

Date:  
10/22/2020

Responsible Line Manager:  
Katie Hurtle

Organization:  
EPC-WMP

Signature:  
Signature on File

Date:  
10/22/2020


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# WCATS User Guide

## Section 1. WCATS User Guide

- ☐ Introduction
- ☐ Desktop Application Overview
- ☐ WCATS Mobile Devices
- ☐ Creating and Managing Waste Streams and WPFs
- ☐ Generating and Managing Waste
- ☐ Treating and processing Waste
- ☐ Tank Transfers and Cementation
- ☐ Administrative and Review Tasks

- ☐ Shipping and Transferring Waste
- ☐ Disposing and Retrieving Waste
- ☐ Managing Waste Storage Areas
- ☐ Creating and Managing the Uniform Hazard Waste Manifest
- ☐ Creating and Maintaining Equipment
- ☐ Resources
- ☐ Frequently Asked Questions
- ☐ Appendices

|                                                                                                                                                                                                                          |                          |                                 |                     |                                                                                   |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------------|---------------------|-----------------------------------------------------------------------------------|--|
| EPC-WMP-WCATS-GUIDE-002                                                                                                                                                                                                  |                          | Revision: 1                     |                     |  |  |
| Effective Date: 10/22/2020                                                                                                                                                                                               |                          | Next Review Date: 10/22/2023    |                     |                                                                                   |  |
| Environment, Safety, Health, Quality, Safeguard, and Security Directorate<br>Environmental Protection and Compliance Division<br>Waste Management Programs Group                                                         |                          |                                 |                     |                                                                                   |  |
| GUIDE                                                                                                                                                                                                                    |                          |                                 |                     |                                                                                   |  |
| Waste Compliance and Tracking System (WCATS) User Guide                                                                                                                                                                  |                          |                                 |                     |                                                                                   |  |
| LA-UR-20-23289                                                                                                                                                                                                           |                          |                                 |                     |                                                                                   |  |
| Subject Matter Expert:                                                                                                                                                                                                   |                          |                                 |                     |                                                                                   |  |
| Name:<br>Alex Baker                                                                                                                                                                                                      | Organization:<br>EPC-WMP | Signature:<br>Signature on File | Date:<br>10/21/2020 |                                                                                   |  |
| Reviewed by Derivative Classifier (Unclassified): E3                                                                                                                                                                     |                          |                                 |                     |                                                                                   |  |
| Name:<br>Gabriel Gallegos                                                                                                                                                                                                | Organization:<br>EPC-WMP | Signature:<br>Signature on File | Date:<br>10/21/2020 |                                                                                   |  |
| Approval Signatures:                                                                                                                                                                                                     |                          |                                 |                     |                                                                                   |  |
| Name:<br>Carol Torres                                                                                                                                                                                                    | Organization:<br>EPC-WMP | Signature:<br>Signature on File | Date:<br>10/21/2020 |                                                                                   |  |
| WMP Team Leader:<br>Elena Martinez                                                                                                                                                                                       | Organization:<br>EPC-WMP | Signature:<br>Signature on File | Date:<br>10/22/2020 |                                                                                   |  |
| Responsible Line Manager:<br>Jackie Hurtle                                                                                                                                                                               | Organization:<br>EPC-WMP | Signature:<br>Signature on File | Date:<br>10/22/2020 |                                                                                   |  |
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# WCATS User Guide

## Section 2: Waste Information Reporting Application (WIRA) Guide

## Section 3: WCATS Administrator's Guide

- ☐ WIRA User Guide
- ☐ WIRA Home
- ☐ WIRA Facility SAT
- ☐ WIRA Custom Reports
- ☐ WIRA Administration
- ☐ WCATS Administrator Guide
- ☐ Application Management
- ☐ Administration Subsystem – System Information
- ☐ Administration Subsystem – System Configuration
- ☐ Administration Subsystem – System Management
- ☐ Administration Subsystem – System Reference
- ☐ Administration Subsystem – Mobile Management
- ☐ Administration Subsystem – Equipment Reference
- ☐ Administration Subsystem – Container Reference
- ☐ Administration Subsystem – Waste Stream Reference

# Waste Containers



- Waste containers are provided by the Waste Management Services (WM-WMS) or NPI for ALDWP.
- There are QA requirements for various waste containers
- It is the WMC/Waste Generator's responsibility to package waste in the "correct container"
  - The "correct container" is driven by (1) logistics and (2) DOT requirements.

**Does the waste fit in this container and is it DOT-compliant?**

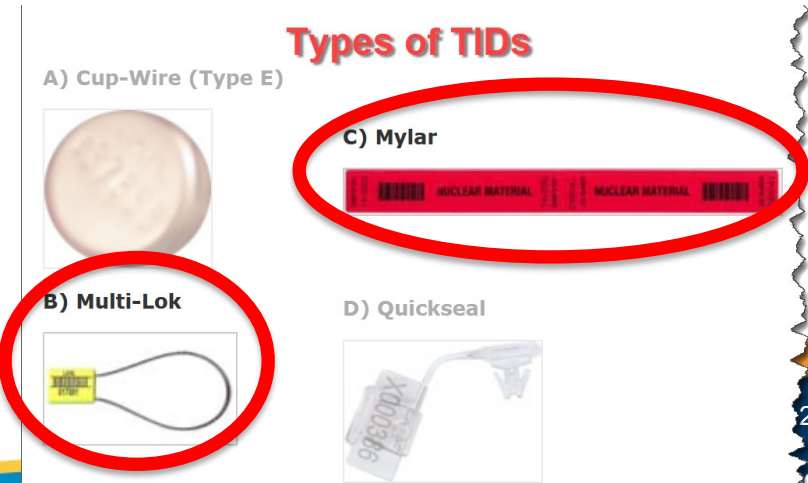
- Solid? Liquid? Rad? Haz Chemical?
- Container compatibility determination before putting the waste in the container
- Volume? (Don't want to pay for a roll-off bin for 4 gallons of contaminated soil)
- There are some very specialized containers used for RAD and HAZ CHEM waste

This requirement to be Department of Transportation (DOT) compliant is why there are numerous Hazardous Materials Packaging and Transportation (HMPT) courses required for workers involved in waste.

# Closure of Waste Containers

- **ALL containers must be closed in accordance with the manufacturer's specifications**
- There are some extra steps involved for containers going to WIPP
- It is now also practice to place a tamper indicating device (TID) on any container being called "closed"
- **Some of our biggest fines stem from improperly closed containers.**

**Container closure  
is huge!!!!**



# Containers and WCATS

- The container/WCATS interface is straightforward: If you have an approved waste stream profile (WSP) in WCATS and a full container you create a **W#**. **That W# number associates that container to that WSP.**
- As part of prepping the drum and adding waste items/containers to WCATS, a label ID is generated for the waste. Once the label ID is generated, an all-in-one label can be printed by the shipping team and applied to the container during the shipping process. Prior to shipment, the WMCs mark the container with the **W#**.
  - WCATS does not auto-generate labeled-IDs for the TRU container types. The labeled IDs for TRU waste (**LA000000XXXXX**) are ordered in preprinted in packs of 100.
- You can enter all kinds of info about a container in WCATS; i.e., weight, dimensions, RAD survey info, manufacturer info, etc.

# Containers - Miscellaneous



- There are currently nearly 75 different container subtypes in WCATS – ranging from a 1.25-gal poly bag to a rail car.
- Nothing in WCATS is deleted. A waste item/container can be dispositioned or canceled but not deleted so the waste containers/items are in WCATS for eternity (Cradle to Grave).
- We reuse some containers like roll off bins all the time.
  - A reusable container will be inspected and assessed prior to each use – looking for damage, rust , holes, functionality, etc.
  - If a container is used for a RAD shipment it will always be used for RAD. (If a roll-off bin was used for rad waste and we wanted to use it for other waste types it would have to be surveyed and released by RP prior to use.)
  - Each use requires a new W#

**REMOVE OLD LABELS!**



# Module 4: Enabling Objectives

---

- Identify responsibilities of Waste Generators at LANL
- Recognize the “Point of Generation” for waste
- Identify capabilities and functions of LANL’s WCATS





# Module 5: Waste Characterization

Waste Management Fundamentals  
for Environmental Professionals

UTrain: 50448

Revision 0; Aug. 2021



# The Modules

- 1: ~~Intro to Waste~~ ✓
- 2: ~~Waste Regulations and Requirements~~ ✓
- 3: ~~Waste Planning~~ ✓
- 4: ~~Waste Generation and Tracking~~ ✓
- 5: **Waste Characterization**
- 6: Waste Packaging
- 7: Waste Accumulation and Storage
- 8: Waste Treatment
- 9: Waste Shipping
- 10: Operating Experience and Lessons Learned

**YOU**  
*are*  
**HERE**

# Waste Characterization

---

- Definition
- Waste Determination
  - General
  - Factors to consider
- Acceptable Knowledge (AK)
- Analysis Chemical / Radiological
- Analytical vs. AK
- Surface-contaminated object (SCO) and other radiological analysis

# Enabling Objectives

---

- Recognize general concepts of waste characterization
- Identify attributes of Acceptable Knowledge (AK)
- Recognize the attributes of various categories of waste
- Recognize waste compatibility concepts
- Recognize radioactive waste characterization concepts
- Identify mixed waste characterization concepts

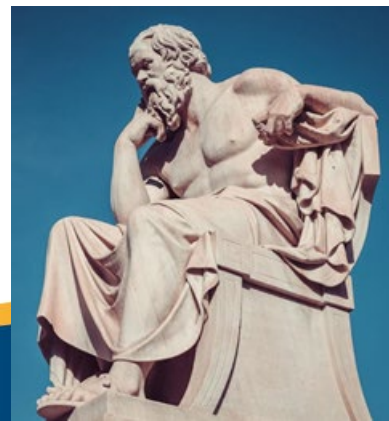


# Waste Characterization – Big Picture

- By the time you're ready to **CHARACTERIZE** the waste you should already have:
  - Determined the material is a waste
  - Planned for the waste generation
  - Have an idea if the waste is regulated or not

- ☐ Data Quality Objectives
- ☐ Defensible Data

Waste characterization is a matter of "how do we know" and "how can we prove" what type of regulated waste it is



# Characterization – What / Who / Why / When

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- **What** (P409 definition) – characterization is the process of determining and documenting the chemical, physical, radiological, biological, and security attributes of the waste.

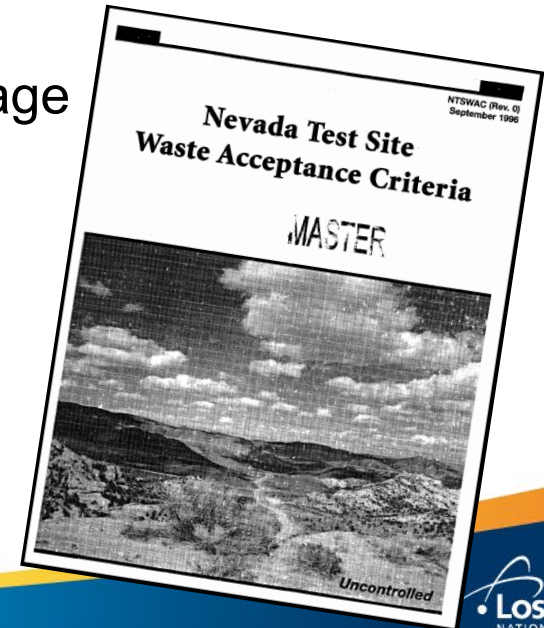


# Characterization – What / Who / Why / When

- **Who** – anyone who throws material away, destroys it, releases it into the environment, or decides that it is not going to be used is a **waste generator**.
  - The individuals making these decisions are normally process personnel who are closest to the work activity.
  - All waste at LANL must be characterized by the cognizant Process Personnel, with WMC and/or NPI assistance.

# Characterization – What / Who / Why / When

- **Why** - required by Federal regulations (40 and 49 CFR), DOE Order 435.1, State waste regulations, and LANL RCRA permit
  - Also required by receiving Treatment Storage and Disposal Facility **Waste Acceptance Criteria (WAC)** to meet their regulatory and permit requirements to receive waste



# The Final Destination

---

- Waste goes somewhere for the long-term
- Where it goes depends on how it's characterized
- Regulated waste goes to regulated Treatment, Storage, Disposal Facilities (TSDFs)
- Those facilities are licensed by the state using EPA guidelines to accept only certain types of waste in accordance with their Waste Acceptance Criteria (WAC)
- We and they must work together to ensure the waste we send to them is in compliance with what they're allowed to accept
  - I.e., their WAC



# Characterization – What / Who / Why / When

- **When** - Any person who generates a waste must make a “**waste determination**” at the “**point of generation.**”  
The waste determination must be made before any dilution, mixing, or other alteration of the waste occurs.
  - Waste determinations are formally documented on Waste Stream Profiles (WSPs) in WCATS

Discussed in  
Module 4



# P409 Guiding Principle

---

*All waste will have a documented hazardous waste determination and will be categorized and managed in a manner consistent with the hazardous waste determination.*



# Waste Characterization Is Challenging

- Here at LANL there are **thousands of processes that generate waste** and determining whether to use AK or sampling and analysis depends on so many factors it becomes an issue of professional judgement at the point of generation.

Using AK to characterize waste is simpler than sampling and analysis

Using **AK** to characterize waste is somewhat less defensible



The key word in AK is “Knowledge”.

*We must be absolutely certain that we have enough knowledge about the given waste stream that making a determination using only AK will be defensible*

# Waste Characterization – Step 1 (AK)

---

- Process personnel collect all available Acceptable Knowledge (AK) information
  - Current and historical documents
  - Analytical results
  - Personnel interviews (document)

NOTE – if **limited** documented AK available you must sample!



# Solid WASTE

*We have to adequately and accurately tell the characterization story so we know where the waste “fits”*

**Excluded  
Waste**

**RCRA  
Solid Waste**

**Excluded  
Waste**

**Hazardous  
Waste**

**Regulated  
Nonhazardous  
Waste**

**NM Special  
Waste**

**Universal  
Waste**

**Listed  
Waste**

**Characteristic  
Waste**

- F-listed
- K-listed
- U-listed
- P-listed

- Ignitable
- Corrosive
- Reactive
- Toxic

**NOTE 2:** *All waste generated at LANL is regulated*

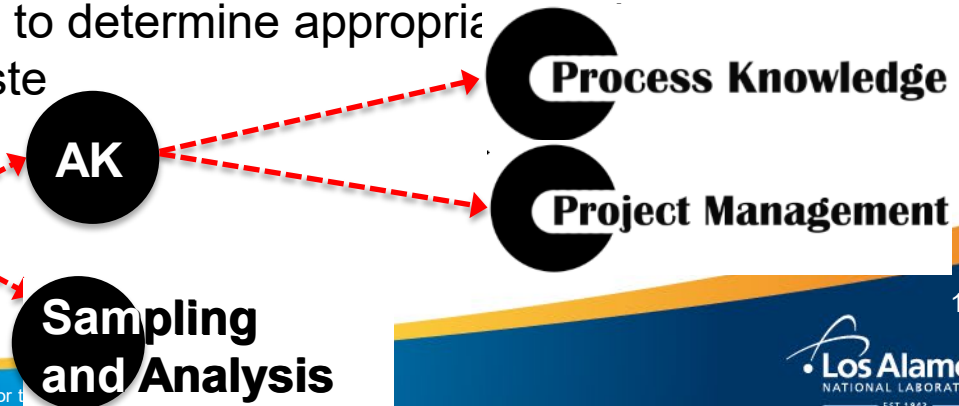
# Acceptable Knowledge (AK)



- AK needs to tell a story of how waste is produced, managed, and disposed.
- AK does NOT mean there is not analytical testing performed. In fact, it can require a lot of testing and various expert analysis. For example, a process may require:

- a chemist to determine the metals leaching into the waste solution
- technical subject matter experts to determine appropriate testing required to characterize the waste

- The more information the better the characterization story



# AK: Process Knowledge (**PK**)

- PK is the best source of AK
- Requires a “knowledgeable person” who understands the process that generated the waste and can (within reason) attest to the nature of the waste
  - A chemist working on a chemical process
  - Physicist working on a particular experiment

**Note: If PK is based on interviews, the interviews must be documented in writing.**



# AK: Process Knowledge (PK)

- Documents related to a process are part of AK
  - Operating procedures
  - Process descriptions
  - Reports
  - Log books
  - Safety Data Sheets
  - Assessments/Issues management



# AK: Process Knowledge (PK)

---

- Analytical results are also part of AK – not required to meet RCRA sampling protocols\*
- Process control samples
- Radiological surveys
- IH monitoring
- In-line process

\*In fact; Analytical results that do not meet RCRA sampling protocols can **ONLY** be used as AK

# AK: Project Management

- We do all sorts of activities that require considerations for the waste. Such as; roofing, new construction, excavation, and demolition.
- Can be trickier and require several knowledgeable persons
- We have many project management planning documents to help us get the right people with the right knowledge involved.

Organization » Facilities & Operations » ES » IRT

## Integrated Review Tool (IRT) and Permits and Requirements Identification (PRID)

IRT integrates Permits & Requirements Identification (PRID), Excavation/Fill/Soil Disturbance Permit Request (EXID), Utility Locates, and Major and Minor Siting Requests under one tool to provide a more cost and time effective review process for users and SMEs, while reducing redundancy between each application and increasing communication and ease of use.

### Contacts

Program Manager  
[Carrie Atencio](#)

[Integrated Review Tool \(IRT\) Log In](#)

### Permits Requirements Identification (PRID)

PRID is a web-based Project Planning tool that provides interactive communication among project participants and LANL Subject Matter Experts (SMEs). Its objective is to identify institutional, state, and/or federal project requirements early in the planning phase of a project, facilitate SME communication and review, and to document compliance with requirements (see [P351 PRID Procedure](#)).



# AK and Sampling Considerations



Origin?



## CONSIDERATIONS:

- Do I have **enough** Acceptable Knowledge at this point?
- I know it has XXX in it because of where it came from – but I don't know **how much** XXX it has in it...
- Sampling is the **most conservative** approach
- While I'm waiting for the sample results, I need to **treat it as if it's...**

***NOTE: Testing results must come from an accredited laboratory***



# Characterizing by Declaration



- While I'm waiting for the sample results, I need to **treat the waste as if it's...**

- Declaration is usually employed when AK or analytical data are incomplete and other circumstances preclude more extensive sampling and analysis. When using this approach, personnel declare a waste to be regulated in a specific manner.
  - **Declaration is ALWAYS to a higher regulatory state; never to a less regulated state.**
- Declaration may also be used while analytical results are pending. In this case, a waste will be managed as hazardous waste (or other appropriate waste type) until analytical results demonstrate that the waste should be managed differently. In these cases, managing by declaration is a preliminary waste determination that changes only when data is returned and a waste stream profile is approved based on the analytical data.

# Characterizing by Declaration

When declaration is used as the final characterization strategy, the waste generator and WMC complete a waste stream profile in WCATS based on the declaration. In the WSP, a declaration is recorded as AK.

*The waste characterization process must result in a legally defensible description of the waste.*

*There are three basic strategies for characterizing waste streams.*

- ***Acceptable Knowledge (AK)***
- ***Declaration***
- ***Direct sampling and analysis***

*While each characterization strategy can be used alone, they are most often combined with other strategies as needed to successfully characterize the waste.*

FSD-P409-0300; 4.1, 4.2, and 4.3

## Step 2 – Determine Sampling Requirements

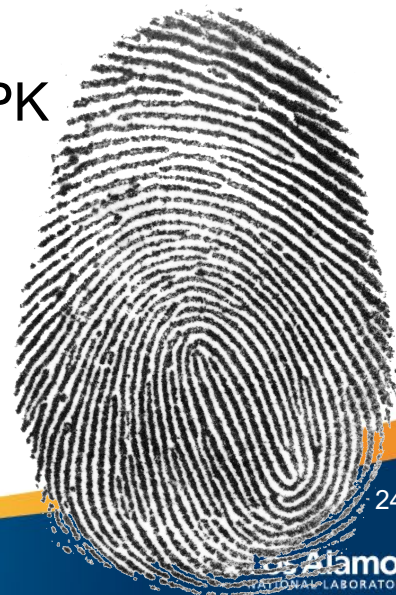
- Review available AK to determine knowledge “gaps”
- Document the rationale for what is “known” and “unknown”
- Work with sampling SMEs to determine best analytical approach to fill gaps.
- Document sampling strategy in a sampling plan.
  - The Waste Characterization and Strategy Form (WCSF) is typically developed from the IRT/PRID system.
- In some circumstances information that is “known” through AK may still be verified by analysis.

**Example:** Use of portable gamma spectroscopy to verify radioisotopes are within expected range

# RCRA Sampling vs Fingerprint Sampling

- RCRA sampling **MUST** follow specific sampling and analytical protocols
- RCRA sampling is the most defensible
- Any sampling that does not meet these requirements is considered **fingerprint sampling** AND is considered AK
- Fingerprint sampling is a good tool to strengthen AK and PK

FSD-P409-0300; 4.1, 4.2, and 4.3





**NOTE:** Testing results must come from an accredited laboratory

# Examples of Fingerprint Sampling

- We do have Industrial Hygienists (IHs) with instruments that can tell us what chemicals/materials we have
  - Detect lead paint, beryllium, asbestos, toxic gasses, radioactive material, etc.
  - We use that information all the time in managing access to an area or precautions to be used
- We also have Radiological Control Technicians (RCTs) with instruments that can tell us what radiological contamination we have
- Operators may use pH and oxidizer strips
  - To help verify what needs to be sampled for
- **HOWEVER, it generally does not provide sufficient information to be used to identify specific waste content amounts**

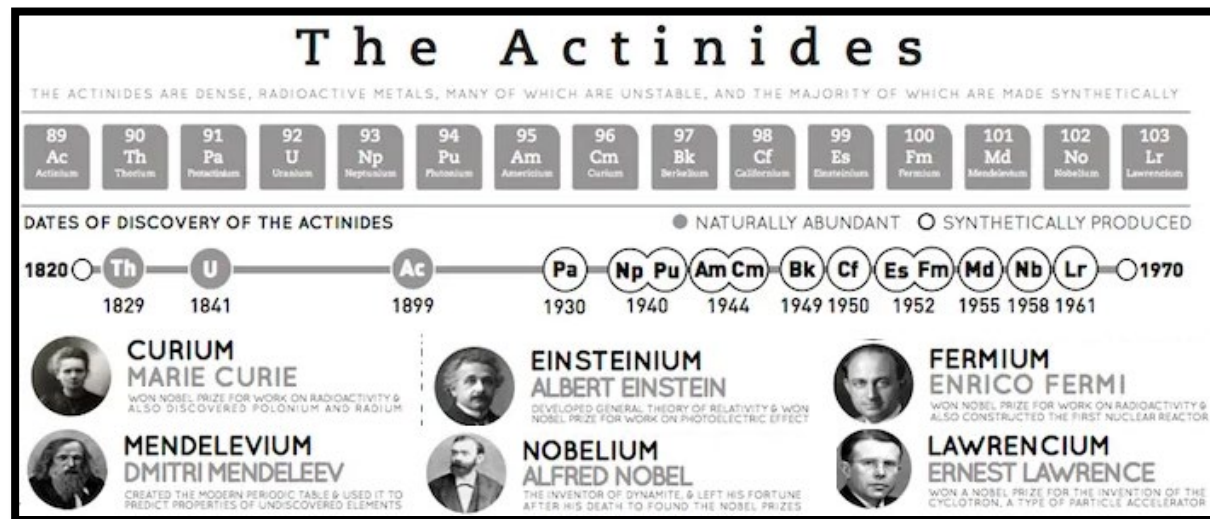
**FSD-P409-300; Waste Characterization and Compatibility**

## 4.3 Characterizing with Sampling and Analysis

Sampling and analysis is a waste characterization method that involves collecting representative samples of the waste and submitting those samples to a certified laboratory for analysis. Wastes must be sampled and analyzed whenever there is an information gap that is not adequately addressed by AK or declaration.

# We have some capabilities

- We do have facilities on-site that do complex chemical and radiological analysis.
- For example, **C-AAC**
  - provides expertise in chemical and radiochemical analysis of materials where actinide elements make up a significant portion of the sample



# AK Factors

- Other forms of AK are work procedures or plans, Safety Data Sheets (SDS) [formerly known as material safety data sheets (MSDS)], chemical analysis results at SMO.
  - Personnel interviews, log books, experimental notebooks
  - Chemistry equations, test plans, mass balance calculations
  - Design documentation
  - Known chemical inputs into a process
  - VI/VE documentation
  - Process knowledge documentation, SOPs
  - Historical chemical inventories



Sample management office (SMO) is the records custodian at LANL for waste sampling results. After a sample has been submitted it goes on a journey from LANL to the lab and the results are sent back to the SMO. The data gets uploaded in EIM – a huge database for sampling data.

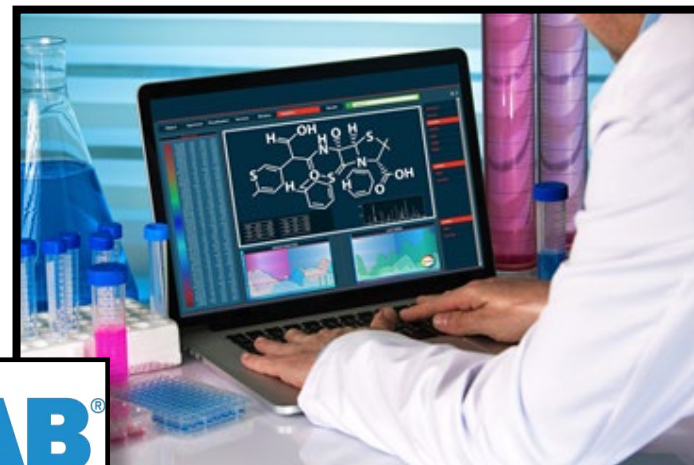
Using an “Event ID” you can see the chain of custody of a sample.

Managed by Triad National Security, LLC for the U.S. Department of Energy's NNSA



# Chemical Analysis

- Only “official” SMO analysis results are entered into EIMS
  - Results come from accredited labs like ALS, GEL, SWERI and ECO labs
- Traceability/Trackability
  - All SMO analytical samples are uploaded into EIMS and WCATS
    - ✓ These analytical data results are defensible
    - ✓ These analytical results have **valid** analytical results that meet waste characterization.
    - ✓ Use to develop Waste Stream Profile (WSP)



# Sampling and Analysis

- Actual analysis from an independent, accredited lab = VERY defensible
- It can take much longer and cost considerably more
- Some factors to consider:
  - Why and what is the sample for?
    - There are literally hundreds of different EPA sampling methods → chose the wrong one and you've wasted time and money
  - Being able to make sense of the sample results from a spreadsheet full of numbers
- The Waste Determination System (WDS)
  - Takes raw data and runs it against known action levels for a given analysis.





## Sample Results From Accredited Lab:

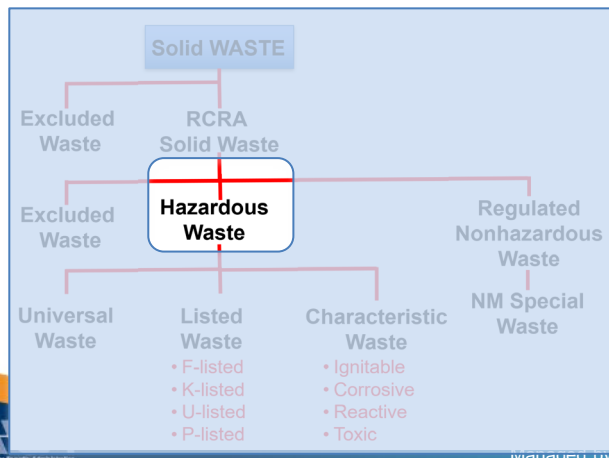
- No limits exceeded – this soil can be reused without restrictions



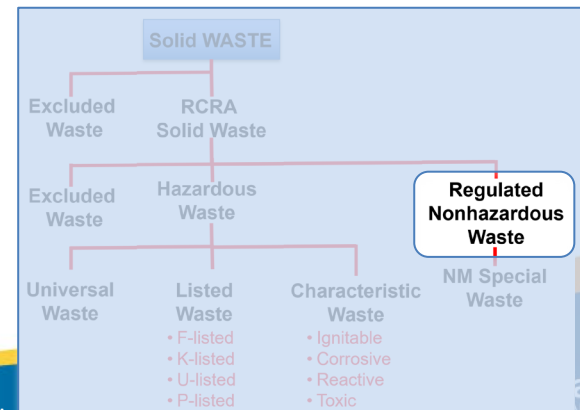
- **LEAD** – over the EPA limit for reuse

- **ALUMINUM** – over the EPA limit for reuse

Not only can we not reuse this soil, it means it will have to be managed as **RCRA Hazardous Waste**



Not only can we not reuse this soil, it means it will have to be managed as **RCRA Regulated, Nonhazardous Waste**



# Part-way Summary:

## Waste Characterization Is **Important**

- Waste characterization is perhaps the **most important** phase in the waste management process
- Determines how waste is managed on site
  - Container type, waste area type, labeling, clock
  - Also determines the facility, shipment type, compatibility, and final disposition of a given waste stream
- Making a correct and defensible determination of a particular waste stream
  - Keeps LANL from being fined
  - Keeps the personnel involved from civil and criminal charges

**IMPORTANT**

# Step 3 – Determine the Category of Waste

- **Non-radioactive waste**
  - Sanitary waste (office trash)
  - Municipal waste
  - Industrial waste (construction/D&D)
  - New Mexico Special Waste
  - Hazardous waste (RCRA, Universal)
- **Radioactive waste**
  - LLW
  - TRU
- **Mixed waste**
  - MLLW
  - MTRU



# Sanitary waste

- At LANL mostly office trash that goes to Los Alamos transfer station then to a sanitary landfill.
- **Most important consideration is that we must keep regulated waste out of the trash!**

Non-hazardous solid waste is regulated under Subtitle D of RCRA. Regulations established under Subtitle D ban open dumping of waste and set minimum federal criteria for the operation of municipal waste and industrial waste landfills, including design criteria, location restrictions, financial assurance, corrective action (cleanup), and closure requirement.



# Municipal waste

- Municipal solid waste (MSW) is defined as **waste collected by the municipality or disposed of at the** municipal waste disposal site and includes residential, industrial, institutional, commercial, municipal, and construction and demolition waste
- These wastes are commonly called trash or garbage and include items **such as food, paper, plastics, textiles, leather, wood, glass, metals, sanitary waste in septic tanks, and other wastes**





# Industrial waste

**Industrial waste** is defined as **waste** generated by manufacturing or **industrial** processes. The types of **industrial waste** generated include cafeteria garbage, dirt and gravel, masonry and concrete, scrap metals, trash, oil, solvents, chemicals, weed grass and trees, wood and scrap lumber, and similar **wastes**.

- Primarily at LANL construction and D&D
- Disposal at landfill permitted to take industrial waste
- Same issue as sanitary waste – **keep other regulated waste out!**



# New Mexico Special Waste (NMSW)

- Storage/Disposal requirements
- Examples at LANL
  - neutralized acid (D002) waste (TFCH)
  - asbestos from building D&D or renovation
  - coal ash from the steam plant
  - sludge from the waste water treatment plant
  - spills of non-hazardous chemicals such as antifreeze
  - hydraulic oil spills from heavy equipment,
  - medical waste from OccMed

A solid waste with unique handling, transportation, or disposal requirements to assure protection of the environment, and the public health, welfare and safety; including

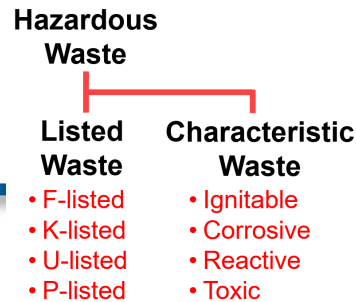
- treated formerly characteristic hazardous wastes (TFCH);
- regulated asbestos waste
- ash
- sludge
- spill of a chemical substance or commercial product...
- Petroleum contaminated soil (PCS)
- infectious waste

| NEW MEXICO SPECIAL WASTE<br>Los Alamos National Laboratory<br>P.O. Box 1663, Los Alamos, NM 87545 |                                           |                                                              |                                           |
|---------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------|-------------------------------------------|
| <b>CONTENTS</b>                                                                                   |                                           |                                                              |                                           |
| <input type="checkbox"/> Asbestos                                                                 | <input type="checkbox"/> Infectious Waste | <input type="checkbox"/> TFCH Waste                          | <input type="checkbox"/> Industrial Waste |
| <input type="checkbox"/> Petroleum Contaminated soil                                              | <input type="checkbox"/> Ash              | <input type="checkbox"/> Spilled chemical/Commercial product | <input type="checkbox"/> Other            |
| <b>HAZARDS</b>                                                                                    |                                           |                                                              |                                           |
| <input type="checkbox"/> Dermal                                                                   | <input type="checkbox"/> Ingestion        | <input type="checkbox"/> Inhalation                          |                                           |
| <input type="checkbox"/> Other                                                                    |                                           |                                                              |                                           |
| <b>Generator</b>                                                                                  |                                           | <b>Phone</b>                                                 |                                           |
| Date placed into Storage<br>Awaiting Transportation                                               |                                           |                                                              |                                           |



# Waste Categories

- RCRA definition of hazardous waste
- Universal Waste
- Toxic Substance Control Act (TSCA)



A **RCRA hazardous waste** is a **waste** that either appears on one of three "lists" created by the U.S. EPA, or, if not on the lists, exhibits one of four "characteristics" of **hazardous waste**.

**Universal waste** is a category of **waste** materials designated as "hazardous **waste**", but containing materials that are very common. It is defined in 40 CFR 273.9, by the EPA but states may also have corollary regulations regarding these materials.

**Universal waste** includes **batteries, pesticides, mercury-containing equipment, lamps, and aerosol cans** (not punctured)

**The TSCA waste of concern at LANL are PCBs.**

**TSCA** of 1976 provides EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. Certain substances are generally excluded from TSCA, including, among others, food, drugs, cosmetics and pesticides.



# Typical LANL Waste Categories

- Municipal Solid Waste
- Industrial Waste
- New Mexico Special Waste
- Universal Waste
- Hazardous Waste
- Nonhazardous Waste
- Low-level Radioactive Waste
- Mixed Low-level Radioactive Waste (both hazardous and low-level radioactive)
- Transuranic Waste
- Mixed Transuranic Waste (both hazardous and Transuranic)
- Sanitary Wastewater
- Polychlorinated Biphenyl (PCB) Waste
- Classified Waste
- Orphan/Legacy Waste
- Hazardous Wastewater
  - High Explosives (HE) waste
  - High Explosives Contaminated Wastewater
  - Low-level Radioactive Wastewater
  - Transuranic Wastewater

*But Wait...*  
**THERE'S  
MORE!**

# Step 4 – Document, Document, Document!

- All supporting documents must be uploaded into WCATS
  - .pdf, scanned, or flat file for analytical data
  - If a document is large and not electronic then provide document control reference for retrieval
- Documentation must include a narrative
  - Address each RCRA characteristic and AK supporting Listed waste determination (e.g., “*waste is not D002 based on pH analysis from analytical report #####, dated 09/26/20, report attached*”)
  - Rad waste determination (e.g., “*non-rad based on NDA performed on 11/24/2019, results attached*”)



# Side Note: Compatibility

- **Three Parts:**

- (1) Verify no incompatible materials in a waste stream to prevent potential reactions that would be harmful to human health or the environment.
- Any time a generator packages wastes from different batches, sources, or processes into the same container, introduces other materials to treat the waste such as neutralizers or sorbents, or adds secondary waste materials to a drum, **compatibility must be verified**.
- (2) Determine compatibility of waste with its packaging to maintain the integrity of the packaging. The waste must be compatible with inner and outer containers and liners, cushioning materials, bags, sorbents or any other materials used to package the waste.



# Compatibility (Continued)



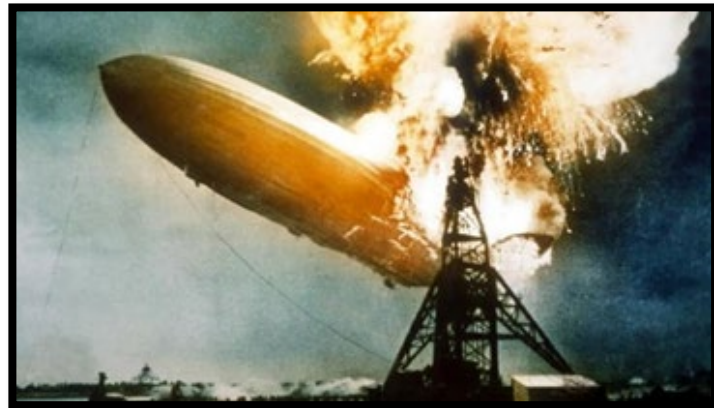
- **Three Parts:** (continued)
  - (3) Containers with incompatible waste materials must be segregated from each other in storage to prevent potential reactions that would be harmful to human health or the environment in the event of a leak or breach of the container(s).
- **Compatibility Determination:**
  - FSD-P409-300, *Waste Characterization and Compatibility* provides instructions for determining compatibility
  - Waste streams must first be adequately characterized to accurately determine compatibility
  - Compatibility must consider length of storage and environmental conditions (temperature, outside storage)





# Waste Compatibility

- Chemicals in the waste must be evaluated using appropriate compatibility tables and references
  - Corrosivity
  - Reactivity
  - Heat generation
  - Gas generation
- Other materials in the waste must also be evaluated
  - Example: some metals can react with water to create  $H^2$  gas



# Container Compatibility

- Waste must be compatible with container per DOT 49 CFR §177.848
  - Note: DOT considers only container compatibility for transportation, not long-term storage. This table would be used for packaging waste into approved DOT containers for storage in TSFs, CAAs, and SAAs.
- Waste containers in storage must be segregated by compatibility groups per 40 CFR §264.177
  - 49CFR173.12 (b) and (e) should be used for exceptions to this table.

| Class                   | 1.1<br>1.2<br>1.5 | 1.3<br>1.6 | 1.4 | 2.1 | 2.2 | 2.3 | 3 | 4.1 | 4.2 | 4.3 | 5.1 | 5.2 | 6.1 | 6.2 | 7 | 8 | 9 |
|-------------------------|-------------------|------------|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|---|---|---|
| Explosive               | 1.1 1.2 1.5       | *          | *   | *   | 4   | 2   | 2 | 4   | 4   | 4   | 4   | 4   | 2   | 4   | 2 | 4 | X |
| Explosive               | 1.3 1.6           | *          | *   | *   | 4   | 2   | 2 | 4   | 3   | 3   | 4   | 4   | 4   | 2   | 4 | 2 | X |
| Explosive               | 1.4               | *          | *   | *   | 2   | 1   | 1 | 2   | 2   | 2   | 2   | 2   | X   | 4   | 2 | 2 | X |
| Flammable gas           |                   | 4          | 4   | 2   | X   | X   | X | 2   | 1   | 2   | 2   | 2   | X   | 4   | 2 | 1 | X |
| Non-flammable gas       |                   | 2          | 2   | 1   | X   | X   | X | 1   | X   | 1   | X   | X   | 1   | X   | 2 | 1 | X |
| Toxic gas               |                   | 2          | 2   | 1   | X   | X   | X | 2   | X   | 2   | X   | X   | 2   | X   | 2 | 1 | X |
| Flammable liquid        |                   | 3          | 4   | 4   | 2   | 2   | 1 | 2   | X   | X   | 2   | 1   | 2   | X   | 3 | 2 | X |
| Flammable solid*        |                   | 4          | 3   | 2   | 1   | X   | X | X   | X   | 1   | X   | 1   | 2   | X   | 3 | 2 | 1 |
| Spontaneous combustible |                   | 4          | 3   | 2   | 2   | 1   | 2 | 2   | 1   | X   | 1   | 2   | 2   | 1   | 3 | 2 | 1 |
| Dangerous when wet      |                   | 4          | 4   | 2   | X   | X   | X | 1   | X   | 1   | X   | 2   | 2   | X   | 2 | 2 | 1 |
| Oxidizing agents        |                   | 4          | 4   | 2   | 2   | X   | X | 2   | 1   | 2   | 2   | X   | 2   | 1   | 3 | 1 | 2 |
| Organic peroxide        |                   | 4          | 4   | 2   | 2   | 1   | 2 | 2   | 2   | 2   | 2   | 2   | X   | 1   | 3 | 2 | 2 |
| Toxic substance         |                   | 2          | 2   | X   | X   | X   | X | X   | 1   | X   | 1   | 1   | X   | 1   | X | X | X |
| Infectious substance    |                   | 4          | 4   | 4   | 4   | 2   | 2 | 3   | 3   | 3   | 2   | 3   | 3   | 1   | X | 3 | 3 |
| Radioactive             |                   | 2          | 2   | 2   | 2   | 1   | 1 | 2   | 2   | 2   | 2   | 1   | 2   | X   | 3 | X | 2 |
| Corrosive               |                   | 4          | 2   | 2   | 1   | X   | X | X   | 1   | 1   | 1   | 2   | 2   | X   | 3 | 2 | X |
| Miscellaneous           |                   | X          | X   | X   | X   | X   | X | X   | X   | X   | X   | X   | X   | X   | X | X | X |

|     |   |   |   |   |                                                                                                                                                                                          |
|-----|---|---|---|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Key | 1 | 2 | 3 | 4 | Must not be loaded in the same transport unit                                                                                                                                            |
|     | X |   |   |   | Can be loaded in the same transport unit - However, individual UN numbers may not be compatible. Compare UN numbers in column 16 of IMDG code or call Strait Shipping to do this for you |

# Compatibility Documentation

- 40 CFR §262.40 and §264.73 and LANL's Hazardous Waste Facility Permit require that compatibility determinations be documented. This documentation can include the following AK source documentation used for characterization and results generated from the various methods of performing compatibility determinations:
  - MSDSs or SDSs for the product or chemicals;
  - Copies of pages from standard references with chemical data for the chemical constituents;
  - Printouts of chemical data from online chemical information sources;



# Compatibility Documentation (Continued)

- Manufacturer information or cut sheets for the products;
- Copies of pertinent portions of procedures used to produce the waste that describe the waste or reactions and/or processes that generated the waste;
- Written notes on composition, reactions, or processes that generated the waste;
- Compatibility documentation must be recorded in WCATS



# Compatibility SUMMARY

- Three major compatibility determinations:
  - **Chemical-to-container** (inner item)
    - Acetone in glass bottle
  - **Chemical-to-chemical solutions and labpacks**
    - Acetone and toluene being packed together.
    - Nitric acid with dimethylformamide (DMF)
  - **Chemical in inner item to DOT container**
    - Acids are not allowed in a metal DOT container
- **Documentation** of chemical compatibility
- Then, compatibility in storage and shipping

## WSP 49882 - Compatibility Statement

Compatibility statement for suspect contaminants of all chemicals used in this process. Most incompatibilities are the use of Strong Acids, Oxidizers, reducing agents, bases, and amines and this waste stream does not use any of these. The acids have incompatibilities with water, metals (in form of reactive metal powders and single metal bond not alloyed), organics, aldehydes, alcohols, halogenated agents, amines, bases, but the acid concentration is less than 2M. The use of weakened acids at 1-12% and sample preparation; therefore, further reduction will generate metal salts like sulfates, acetates, nitrates, phosphates and possible chlorides in concentrations of 1-3% per use. This is not the majority of the waste stream. The majority is cellulosic and glass/ceramics. These acid salts are trace or <1% on potentially polymer wipes or other substrates. None of these salts are Strong acids, bases, oxidizers, reducing agents or alkali metal salts. Chemicals like Devcon, Duco-Cement, Gorilla glue, H or N Grease, Lanthanum Boride, silver epoxy, GE varnish, De-Solve-it, Stycast 2850 blk and blu, Quartz wool, vac grease, toluene, methanol, ethanol, ethyl benzene, acetone, xylene, alcohol, n-butyl acetate, ensolve 5408, and metals (these become alloyed in process) will not have any reactive chemistry at the concentrations previously discussed. Epoxies will be completely reacted and phenolic resins will have no epichlorohydrins as epoxy dries and no amines are in waste stream. Items with no compatibility concerns are metal alloys produced in process, alumina, Torr-Seal, Crystalbond, Stycast A&B that complete their phenolic resin bond, solder, Glance, Fantastik and trace amounts of water. No inorganic alkaline solutions are in the waste stream, although some disinfectants that have sodium lauryl sulfate, glycolic amine or ammonia chloride surfactants are used with a pH between 10.5 and 11.75 but are used to dryness and will not have this pH value once it is spent. Sulfates, phosphates and acetates may become reducing agents, but with this weakened concentration, reaction is eliminated by its ppm limit. Nitrates are oxidizers and in this waste stream not a strong oxidizer at concentrations less than 10,000 ppm, many of which are removed during furnace operations. Fluorinert FC-43 will not be in contact with alkali or alkaline earth metals or any finely divided powders, because these metals in the WSP are alloyed (micron size > 400) and epoxied to substrate. Precautions: Polymer wipes should be used with nitric acid, although at 2M, cellulosic wipes can be used. All spills of raw chemicals in this process will be managed in separate profile because this concentration has not been analyzed for compatibility.

Prepared in cooperation with Jessica Hebert and Steve Shelton 2-8-2021 for WSP 49882

Digitally signed by

Date: 2021.05.24  
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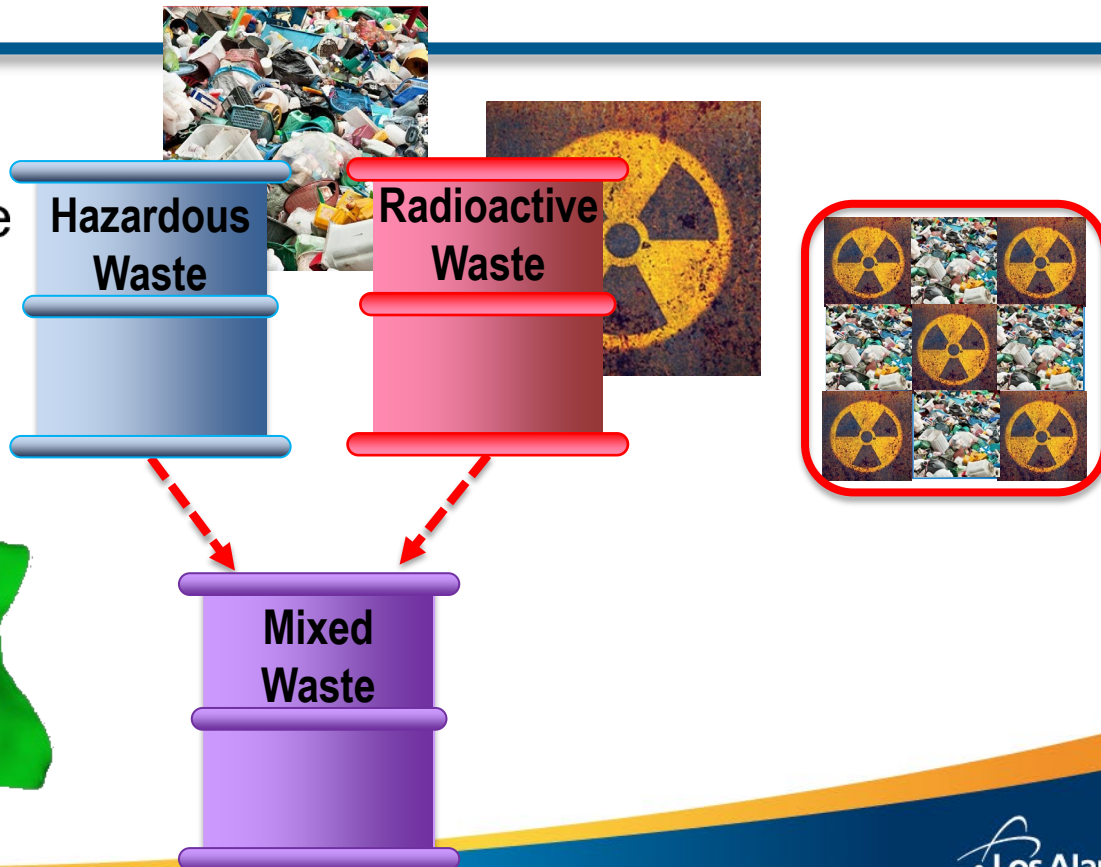
# Radioactive Waste

- Category of Waste:
  - Non-radioactive waste
  - Radioactive waste
  - Mixed waste



# Mixed Waste

- Category of Waste:
  - Non-radioactive waste
  - Radioactive waste
  - Mixed waste





# Radioactive Waste

- Addressed in DOE Order 435.1; *Radioactive Waste Management*

**U.S. Department of Energy**

**Washington, D.C.**

**ORDER**

DOE O 435.1

Approved: 7-09-99

Review: 7-09-01

**SUBJECT: RADIOACTIVE WASTE MANAGEMENT**

- OBJECTIVE.** The objective of this Order is to ensure that all Department of Energy (DOE) radioactive waste is managed in a manner that is protective of worker and public health and safety, and the environment.
- CANCELLATION.** This Order cancels DOE 5820.2A, RADIOACTIVE WASTE MANAGEMENT, dated 9-26-88. Cancellation of that Order is not by itself modify

# Rad Waste Topics

- **Types** of rad waste
- Rad waste **contamination**
- **Characterization** of rad waste
  - NDA vs. DA methods
  - Portable Gamma Spectroscopy
    - Ensuring results are accurate
  - Getting the rad waste analyzed
- **Surface Contaminated Object (SCO)**
  - What it is, essential components
  - How it works for known contaminated LLW for DOT compliance
- **Health Physics Analysis Lab (HPAL)**
  - Some sophisticated instrumentation
  - Things we do at HPAL
  - Screening (for offsite waste acceptance per SMO – **NOT for waste characterization**)
  - QC considerations
- **SAFE-NMCA**
  - SAFE TIDs / Physical Security
    - Level III Locks



# Types of Radioactive Waste

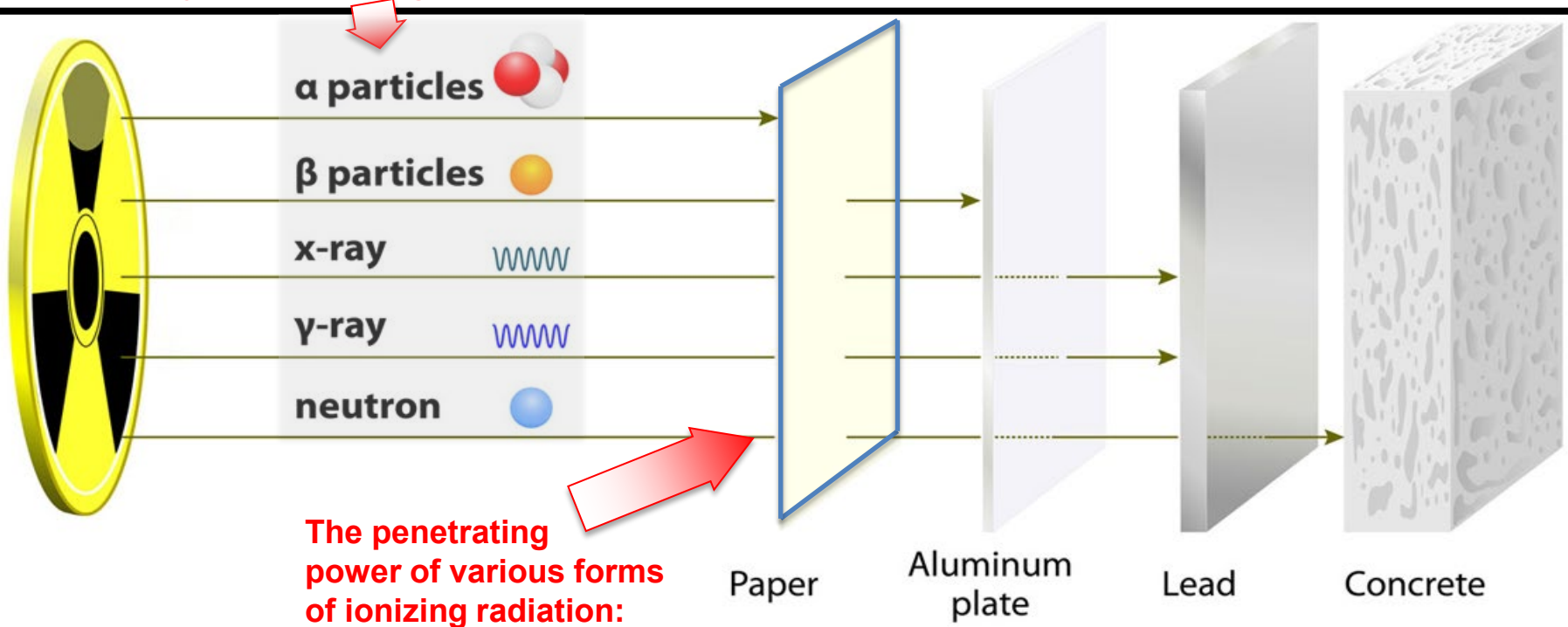
- **Defense waste** – radioactive waste generated by atomic energy defense activities of the United States
  - Only defense waste can be disposed of at the Waste Isolation Pilot Plant (WIPP)
- **Non-Defense waste**-radioactive waste generated that is not atomic energy defense related (Isotope production)
- **Transuranic (TRU) waste** – waste that contains more than 100 nanocuries (3700 Bq) of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years.
- **High-level waste (HLW)** – spent nuclear fuel or waste resulting from solvent extraction systems in reactor fuel reprocessing facilities (not produced or disposed of by LANL)

# Types of Radioactive Waste (cont.)

- **Low-level waste (LLW)** – radioactive waste that is NOT high-level waste, transuranic waste, or by-product material such as uranium mill tailings
- **Mixed waste** – radioactive waste containing both radioactive and chemically hazardous constituents as defined by the United States Resource Conservation and Recovery Act (RCRA)
- **Naturally Occurring and Accelerator-Produced Radioactive Material (NARM/NORM)** – radioactive waste products from the operation of atomic particle accelerators and naturally occurring radioactive materials whose natural radioactivity has been technologically enhanced

# Penetrating Power of Radioactive Contamination

## Types of ionizing radiation



# Characterizing Radioactive Waste

- The (1) type of radioactive waste matrix (LLW, Defense Waste, HLW, etc.), and, (2) the type of contamination (alpha, beta, gamma, or neutron) determine the appropriate method(s) to characterize the radioactive waste
- We can use non-destructive analysis (NDA) and destructive analysis (DA)
  - **Nondestructive analysis (NDA)** - the quantitative or qualitative determination of the kind and/or amount of nuclear material in a waste item *without alteration or invasion of the item*
  - **Destructive analysis (DA)** - the process of taking small samples from the item in question, analyzing those samples by chemical or radiological analysis, destroying the original nature of the samples in the process, and applying the sample results to the entire item

# Classes of Low-Level Radioactive Waste



Home ▶ NRC Library ▶ Basic References ▶ Glossary

## Waste classification (classes of waste)

Classification of [low-level radioactive waste \(LLW\)](#) according to its radiological hazard. The classes include Class A, B, and C, with Class A being the least hazardous and accounting for 96 percent of LLW. As the waste class and hazard increase, the regulations established by the NRC require progressively greater controls to protect the health and safety of the public and the environment. For the specific regulations, see Title 10, Section 61.55, of the Code of Federal Regulations ([10 CFR 61.55](#)), "Waste Classification."

**NOTE: There is also a "GTCC"  
– Greater than Class C**



# NDA Radioactive Waste Analysis Methods at LANL

- High Purity Germanium (HPGe) detectors
- Neutron counters
- Non-Destructive Assay (NDA) Systems
  - Transuranic (TRU) waste assay destined for Waste Isolation Pilot Plant (WIPP) disposal must be measured by specially authorized NDA systems
- LANL Surface Contaminated Object (SCO) program
- Calculations based on dose rates
- LANL Green Is Clean (GIC) program



# DA Radioactive Waste Analysis Methods at LANL

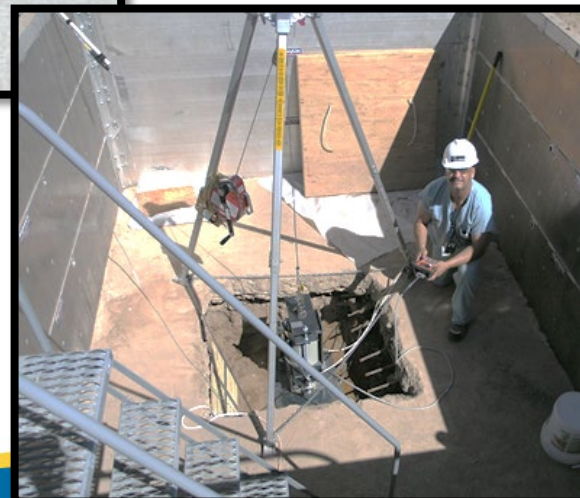
- Triad can do some analysis on-site to be used as AK
  - HPAL, RLWTF analytical lab, C-AAC and a few others
  - plus pH stripes, peroxide stripes and oxidizer stripes, etc.
- Sample analysis by commercial labs



# Portable Gamma Spectroscopy Equipment

- **Portable gamma spectroscopy equipment used at LANL:**
  - High purity germanium (HPGe) detectors or sodium iodide (NaI) detectors
  - DigiDart Multichannel Analyzers (MCSs)
  - Portable carts
  - Portable shielding
- **Containers portable detectors can assay:**
  - Small containers (e.g., 5-gallon bucket)
  - 30, 55, & 85 gal (114, 208, 322 liter) drums
  - 90- ft<sup>3</sup> (2.5 meter<sup>3</sup>) metal waste boxes
  - Standard waste boxes (SWB) TRU Waste
  - Overpacks
  - Transportainers
  - Roll-off bins
  - Bulk
- there are multiple sizes IP-1 and IP-2 containers greater than 45 ft<sup>3</sup>

# Action photos of Portable Gamma Spectroscopy Equipment



# Quality Control and Portable Gamma Spectroscopy

- There are many requirements to ensure our spectroscopy results are accurate
  - Instrument calibrations and daily checks
  - Operator/Analysist training
  - Performance limits in procedures
- Additional requirements may be imposed by the receiving facility's WAC
  - E.g., Nevada National Security Site (NNSS) and Waste Isolation Pilot Plant (WIPP)

| CALIBRATION      |                  |
|------------------|------------------|
| COMMENTS         | _____            |
| _____            |                  |
| BY               | _____ DATE _____ |
| NEXT CALIBRATION | _____            |

# Rad Waste Generator and WMC Coordination

---

- Identify the information required from the rad waste generator and the WMC in order to submit requests for portable assays and surface contaminated object (SCO) measurements
  - How many containers, what size are they, where are they located, what's in them, gross and tare weights, expected radionuclides and minimum detectable activity (MDA) levels needed, time-line for completion (usually allow at least a week), cost codes.



# Surface Contaminated Object (SCO) Program

- A surface contaminated object (SCO) -- is a solid object which itself is not radioactive, but which has fixed and/or removable radioactive contamination distributed on any of its surfaces
- SCO characterization is based on sampling the contamination level per area on a surface
- Radioactive waste must also meet the disposal facility's WAC prior to shipping for disposal
- Essential components:
  - Accurate calculation of the surface area of SCO
  - Reliable health physics instruments
  - Representative sampling points
  - Defensible statistical calculation of the level of activity for an SCO item or group of items
- For items contaminated with transuranic (TRU) radionuclides, an accurate waste mass is required to determine whether the items can be disposed of as low-level waste or are TRU waste





# SCO Program (cont.)

- The isotopic identification and distribution of radionuclides must be known
  - Isotopics can be determined by AK, NDA (gamma spectroscopy), or via samples for lab analysis
- The standard protocol requires 30 or more survey points for both inaccessible and accessible areas of a waste item
  - Survey results are collected from randomly selected locations
- The total surface of the item is required to determine the total activity

## DEFINITIONS

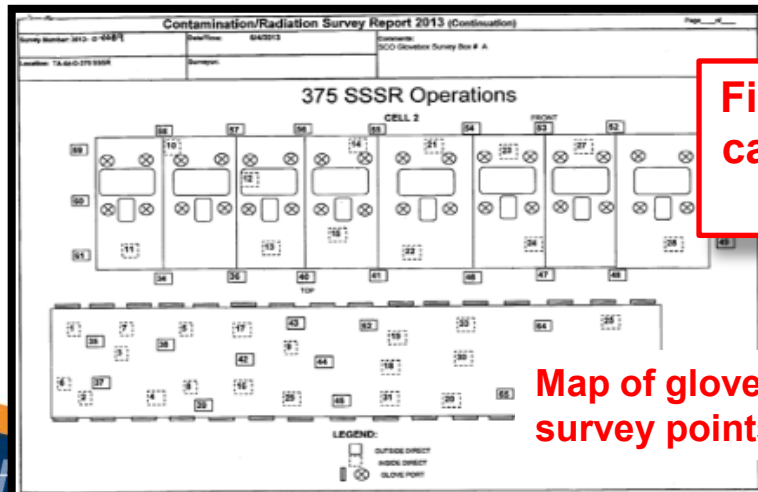
- **Radioisotopes/radioactive isotopes** of an element can be defined as atoms that contain an **unstable nucleus** and dissipate excess energy by spontaneously emitting radiation in the form of alpha, beta and gamma rays.

# SCO Accessible/Inaccessible Surfaces Concept

- An **accessible surface area** is one that could be contacted if the packaging is removed by an accident - any surface which can be readily reached by a person's hand, using standard radiation measuring techniques is an accessible surface.
- Any other surface is called an **inaccessible surface** - any surface which requires disassembly to be surveyed using standard radiation measurement techniques or requires a tool to gain access to an area.
  - There still must be a means of determining the activity level of inaccessible surfaces to assure that the applicable SCO limit is met.

# SCO Survey Map

- Example of a survey map for a decontaminated glovebox
  - 33 survey points outside the box (**accessible**)
  - 33 survey points inside the box (**inaccessible**)
  - survey points numbered to match RP-1 Radiological Survey Form



**Final results of SCO calculations may be verified by NDA**

**Map of glovebox with survey points marked**

Contamination/Radiation Survey Report 2013

RWP NUMBER: 2012-0175 REV.12

Survey Number: 2013-06202 Date/Time: 03/01/13 1600 Location: 16.54-G 221 SSSR D. GERS

Alpha Beta

Survey Results Table:

| Survey Number | Date/Time     | Location | Alpha | Beta | Gamma | Neutron | Other |
|---------------|---------------|----------|-------|------|-------|---------|-------|
| 1             | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 2             | 03/01/13 1600 | SEE MAP  | N/A   | 21   | 21    | N/A     | N/A   |
| 3             | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 4             | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 5             | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 6             | 03/01/13 1600 | SEE MAP  | N/A   | 12   | 12    | N/A     | N/A   |
| 7             | 03/01/13 1600 | SEE MAP  | N/A   | 4    | 4     | N/A     | N/A   |
| 8             | 03/01/13 1600 | SEE MAP  | N/A   | 1    | 1     | N/A     | N/A   |
| 9             | 03/01/13 1600 | SEE MAP  | N/A   | 12   | 12    | N/A     | N/A   |
| 10            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 11            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 12            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 13            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 14            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 15            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 16            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 17            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 18            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 19            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 20            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 21            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 22            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 23            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 24            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 25            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 26            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 27            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 28            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 29            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 30            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 31            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 32            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |
| 33            | 03/01/13 1600 | SEE MAP  | N/A   | 3    | 3     | N/A     | N/A   |

Signature: [Signature] Date: 12/15/13

# SCO Program – Quality Control (QC)

---

- RCT instruments used must meet RP quality control requirements
- Instrument calibration must be current
- Daily instrument QC checks
- Training must be current
- Procedures must be up to date
- Background check done
- Final results of SCO calculations may be verified by NDA



# Health Physics Analysis Lab (HPAL)

- We have a HPAL with some sophisticated radiation measurement instruments
  - Berthold (gas proportional counter)
  - Integrated Minicomputer Pulse (IMPULSE) counting system
  - Gamma spectroscopy counting systems
  - Liquid Scintillation Counting (LSC) Systems
- Things we do at HPAL
  - Alpha/Beta counting (~93% of all samples)
  - Liquid Scintillation (~6%)
  - Isotopic analysis by alpha, beta, and photon spectroscopy (~1%)



# Quality Control (QC) Requirements

- All instrumentation used must meet quality control requirements
  - Instrument calibration must be current
  - Daily instrument QC checks
  - Training must be current
  - Procedures in place and up to date
  - Background checks performed
- For HPAL
  - NIST Traceable Standards\*
  - DOE Mixed Analyte Performance Evaluation Program (MAPEP)
    - Gross alpha/beta air filter, Mixed gamma air filter, mixed gamma soil
  - Expert data reviews





# Radioactive Waste

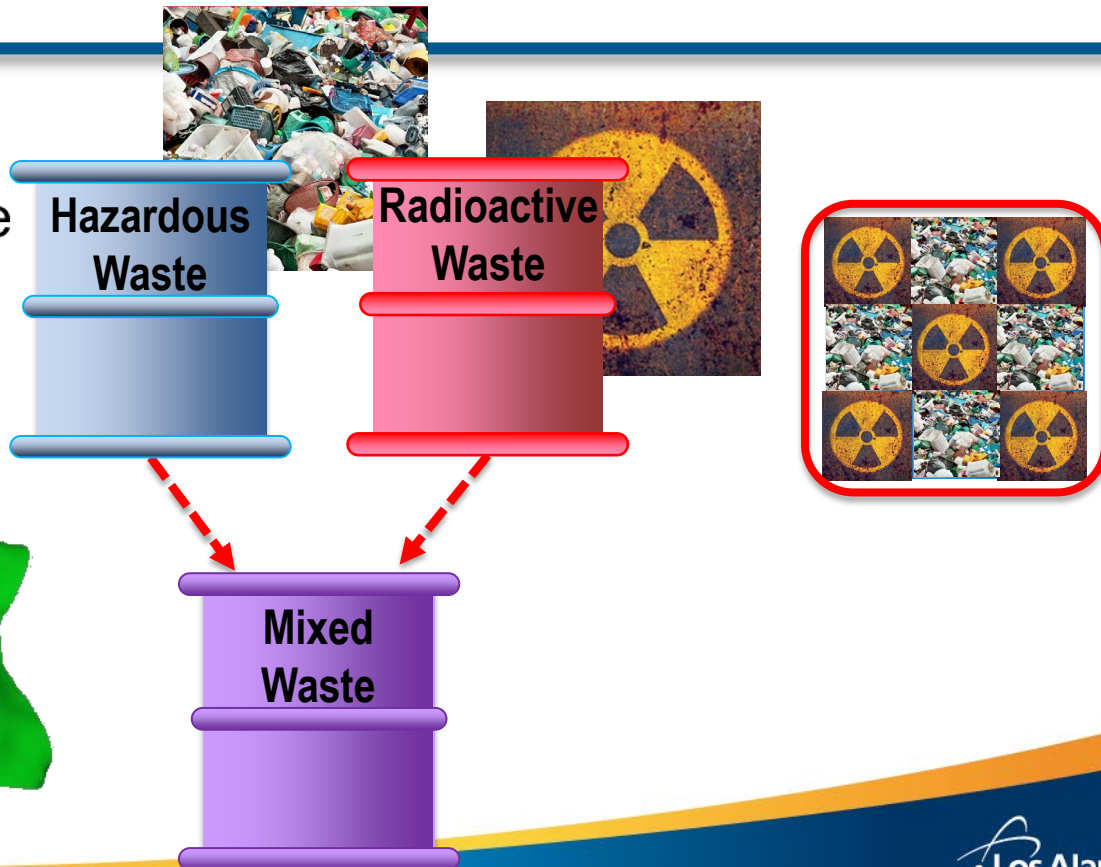
- Category of Waste:
  - Non-radioactive waste
  - Radioactive waste
  - Mixed waste





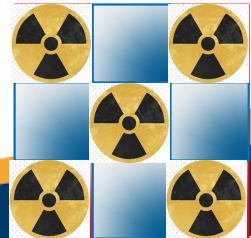
# Mixed Waste

- Category of Waste:
  - Non-radioactive waste
  - Radioactive waste
  - Mixed waste



# Mixed Waste in General

- Mixed waste contains both radioactive and hazardous waste components
  - As a result, both **treatment** and **regulation** are complex
- Mixed wastes are regulated by the Resource Conservation and Recovery Act (RCRA) and the Atomic Energy Act (AEA). In general, the requirements of RCRA and AEA are consistent and compatible.
  - However, in cases where requirements of the two acts are found to be inconsistent, the AEA takes precedence.
- The U.S. Nuclear Regulatory Commission (NRC) and the US Department of Energy (DOE) regulate the radioactive portion of mixed waste under AEA authority, while EPA regulates the hazardous waste portion of mixed waste under RCRA authority.



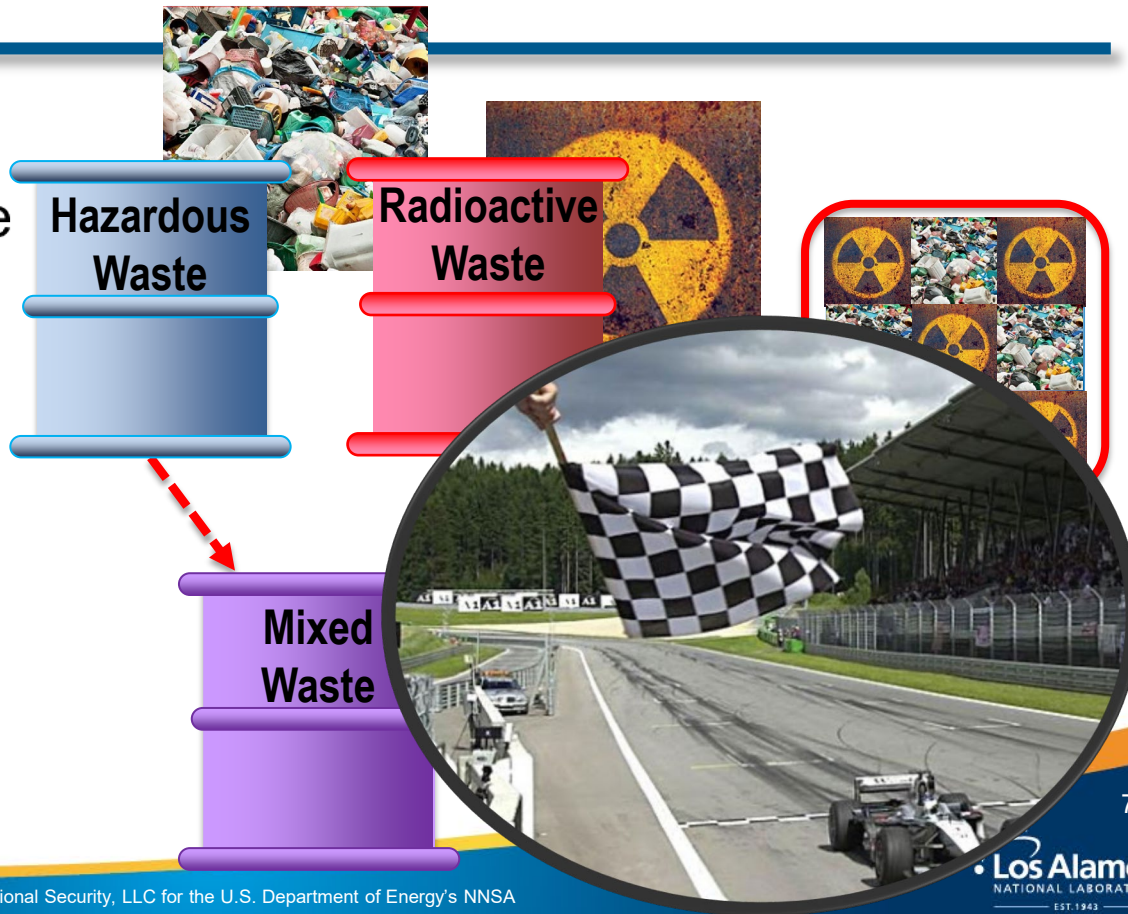
# How we Handle Mixed Waste

- LANL works hard to ensure we don't create mixed waste
- When/if we do have mixed waste, we manage it based on the hazardous constituent (RCRA requirements)
  - The RCRA requirements are **more conservative** because CAA:
    - 1. Has more conservative inspection rules; *and*,**
    - 2. Must be shipped before 90 days**
- Mixed waste (such as MTRU) stored in a TSF
  - **Must go on Site Treatment Plan (STP) after one year**

**NOTE:** If mixed waste cannot be shipped within 90 days, NMED must be notified and an extension requested.

# Mixed Waste

- Category of Waste:
  - Non-radioactive waste
  - Radioactive waste
  - Mixed waste



# Module 5: Summary

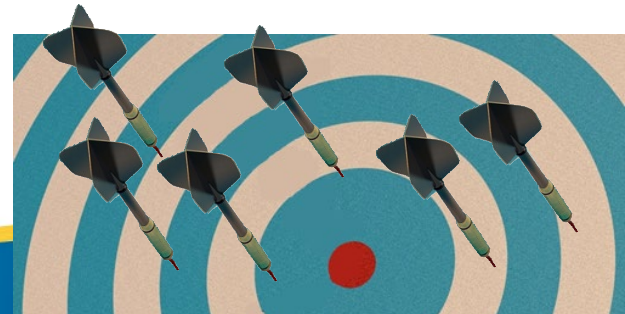
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- Waste Management Process
- Waste Determination
  - General
  - Factors to consider
- Waste Types
- Acceptable Knowledge (AK)
- Chemical Analysis
- Analytical vs. AK
- Surface-contaminated object (SCO) and other radiological analysis

# Enabling Objectives

---

- Recognize general concepts of waste characterization
- Identify attributes of Acceptable Knowledge (AK)
- Recognize the attributes of various categories of waste
- Recognize waste compatibility concepts
- Recognize radioactive waste characterization concepts
- Identify mixed waste characterization concepts





# Module 6: Waste Packaging

Waste Management Fundamentals  
for Environmental Professionals

UTrain: 50448

Revision 0; Aug. 2021





# The Modules

- 1: ~~Intro to Waste~~ ✓
- 2: ~~Waste Regulations and Requirements~~ ✓
- 3: ~~Waste Planning~~ ✓
- 4: ~~Waste Generation and Tracking~~ ✓
- 5: ~~Waste Characterization~~ ✓
- 6: **Waste Packaging**
- 7: Waste Accumulation and Storage
- 8: Waste Treatment
- 9: Waste Shipping
- 10: Operating Experience and Lessons Learned



# Topics

- Choosing a container
- Container compatibility
- For collection / storage
- For shipment – DOT
- Container closure



# Enabling Objectives

---

- Recognize the factors that influence selection of an acceptable waste container
- Recognize the DOT requirements for waste packaging



**If you trust the container,  
you don't have to worry  
about the contents...**



# Waste Containers

This course just gives an awareness regarding aspects of waste containers

- Not just a case of, “*will this waste fit into this container?*”
- MANY more considerations
  - Many technical details
  - Extra requirements





# A Variety of Containers

## Container Technologies Industries, LLC

### Closure Procedure

#### Bolted Closure Container Customer Installed Gasket

*Document No. 9999900050- Revision 4*

*Date: 11/16/2010*

#### 1.0 Install Gasket

- 1.1 Inspect sealing surface (surface onto which adhesive side of gasket will be applied)
  - 1.1.1 If surface is contaminated with dirt, oils, etc., clean surface using mild solvent (detergent, 409 cleaner, etc.) ... otherwise proceed to 1.1.2
  - 1.1.2 Clean/dry surface with a clean, dry towel
- 1.2 Unroll the supplied gasket material and expose 12 – 18 inches of adhesive by removing the white, non-stick tape
- 1.3 Begin installing the gasket from one corner on the lid, firmly pressing the gasket with fingers or a small roller – continue to remove the protective non-stick tape ahead of the point of gasket installation

Environment / Waste Support / Management / COCs / Full Listing

## Container Certificates of Conformance & Closure Instructions

|                 |   |                          |   |
|-----------------|---|--------------------------|---|
| 5-Gallon        | ▼ | B-12s                    | ▼ |
| 14-Gallon       | ▼ | B-25s (IP-1) PO 2015-107 | ▼ |
| 15-Gallon       | ▼ | B-25s (IP-1) PO 0570     | ▼ |
| 20-Gallon       | ▼ | B-25s (IP-1) PO 0464     | ▼ |
| 30-Gallon Poly  | ▼ | B-25s (IP-1) PO 0364     | ▼ |
| 30-Gallon Steel | ▼ | B-25s (IP-1) Other POs   | ▼ |
| 55-Gallon Poly  | ▼ | Other Container Types    | ▼ |
| 55-Gallon Steel | ▼ | Legacy (2005)            | ▼ |
| 85-Gallon       | ▼ |                          |   |
| 110-Gallon      | ▼ |                          |   |

[https://int.lanl.gov/environment/waste/waste\\_mgt/certificates-of-conformance/all.shtml](https://int.lanl.gov/environment/waste/waste_mgt/certificates-of-conformance/all.shtml)

# A Variety of Containers

Lot No.:39

Serial No's : 1067-1094

Customer Facility: Navarro Research and Engineering, Inc.  
Los Alamos NM

Container Technologies Industries, LLC certifies that the above product has been inspected and / or tested by me or my designated inspector and that it meets or exceeds the Quality Control requirements identified in the above specification / Purchase Order and Container Technologies Industries, LLC workmanship standards and Quality Assurance Manual. The LSA waste container (s) specified in this document comply with U.S. Department of Transportation (U.S. DOT) 49 CFR, 173.465(b) and (c2), 172.310 (a), (b), (C), 173.410, 173.410 (f), 173.24, 173.411 (a), (b2), (b3), 173.412, CTI certifies the containers to be compliant with NNSSWAC Current Rev Stack and LANS. Specification listed above. Based upon performance history using this type of container or leakage, the vibration test procedure outlined (Note that no suspect or counterfeit parts have been used). All welding in compliance with A.W.S. D1. 3-08. Scales used to determine tare weight are calibrated.

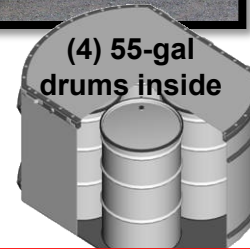
**There are many requirements for containers. Therefore, containers must be acquired through appropriate channels.**

- **LLW containers** are provided by **WM-WMS**
- **TRU containers** must be provided through **WIPP**

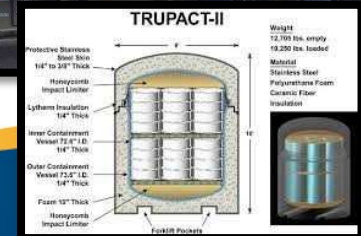


# Examples of Containers

- Roll-off bin
- Standard Waste Box (SWB)
- TRUPACT

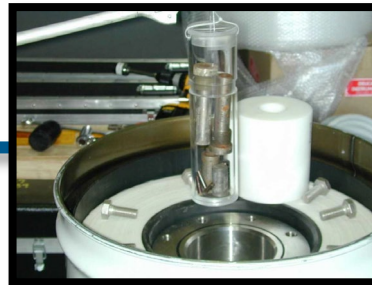


SWBs are used for TRU waste only and are specifically designed to be placed in a TRUPACT



# Examples of Containers

- Pipe Over Pack Container (POC)
- Flanged Tritium Waste Container (FTWC)
- Lab Pack
- Type 7A 55-gallon steel drum
- B-25 / B-12



These containers are for LLW  
and are not used for TRU waste

# Rad Waste Containers – Type A

Tests for Class 7  
(Radioactive)  
**Type A** Packaging

- The DOT specifies that radioactive materials are Class 7. Class 7 containers include **Type A** containers and **Type B** containers.
- Type A packagings must prevent the loss or dispersal of the radioactive contents and maintain the radiation shielding properties during normal conditions of transportation. The packaging, with contents, must be capable of withstanding the **four tests** specified in 49 CFR 173.

## Water Spray Test:

simulates the package having been left in rain at a rate of about two inches/hour for a period of at least one hour

*The water spray test must precede each test or test sequence.*



## Free-Drop Test:

1 to 4 ft (depending on the package mass) onto a hard surface, in the most damaging orientation—simulating falling off a vehicle or loading platform (additional requirements are used for fiberboard, wood, and fissile material packages)



## Stacking Test (compression):

equal to a force of at least five times the weight of the package **or** the equivalent of 1.9 psi multiplied by the vertically projected area of the package for at least 24 hours—simulating the damp package being at the bottom of a stack of packages.



## Penetration Test:

A 13.2-lb, 1.25-in.-diameter steel rod is dropped at least 3.3 ft onto the damp package—simulating a loose object hitting the package.



# Rad Waste Containers – Type B

Tests for  
Class 7  
(Radioactive)

## Type B Packaging

- **Type B** packaging is the most robust packaging for radioactive material.
- **Type B packaging must meet the standards for Type A packages and additionally must have the ability to survive serious accidents** (hypothetical accident conditions).
- The following tests are to be done sequentially (except the immersion test for all packages, which may be done on a separate specimen)



### Free-Drop

A nine-meter (30-ft) freefall of the test package onto an unyielding surface in a position for which maximum damage is expected.

**Crush:** For packages with a mass not >500 kg (1100 lb), overall density not >1000 kg/m<sup>3</sup> (62.4 lb/ft<sup>3</sup>), and, for normal form non-fissile material, contents >1000 A2: subjecting the test specimen to a dynamic crush test by positioning the specimen on a flat, unyielding horizontal surface so as to suffer maximum damage by the drop of a 500-kg (1100-lb) steel plate mass from 9 m (30 ft) onto the test package.



# Rad Waste Containers – Type B (continued)

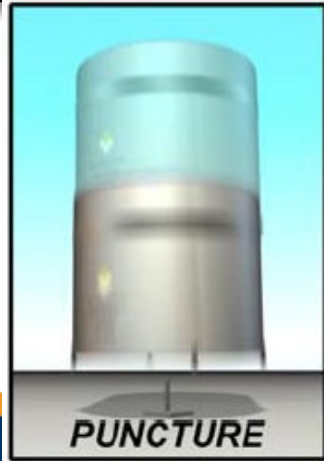
Tests for  
Class 7  
(Radioactive)  
**Type B**  
Packaging

Again, there are many requirements for containers. Therefore, containers must be acquired through appropriate channels.

- LLW containers are provided by WM-WMS
- TRU containers must be provided through WIPP

## **Puncture:**

A free-drop of the test package from a height of 1 meter (40 in.) onto a 15-cm (6-in.)-diameter vertical steel peg that has a length to cause maximum puncture.



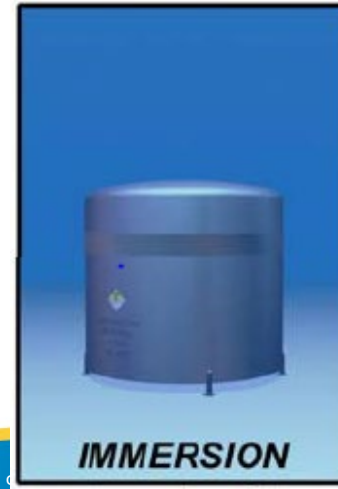
## **Thermal:**

Exposure to a fully engulfing thermal environment of at least 800°C (1475°F) for 30 minutes



## **Immersion—All Packages:**

Water immersion of the test package at least 15 m (50 ft) deep. In addition, packages containing more than 105 A2 must be designed to withstand an external water pressure of 2 MPa (290 psi) for a period of not less than 1 hr without collapse, buckling, or in-leakage of water





# Safety First!

- Always use the correct, approved container handling equipment – drum dolly, forklift, pallet jack
- Always wear appropriate PPE – safety shoes, safety glasses, gloves
- Do not accept any containers that are leaking, open, or significantly defective in any way (e.g., containers that are severely rusted, bulging, or corroded)



# Choosing a container:

- 1<sup>st</sup> question: *Is the material regulated?*

- *DOT Hazardous Material*
- *RCRA regulated waste*
- *TSCA regulated waste*
- *State regulated waste*

How do those regulations affect waste packaging?

- Depending on the hazmat and quantities, performance packaging (UN Standard or DOT-Specification packaging) may be required.

- *Anyone packaging a DOT hazardous material is considered a HAZMAT employee and must be trained.*

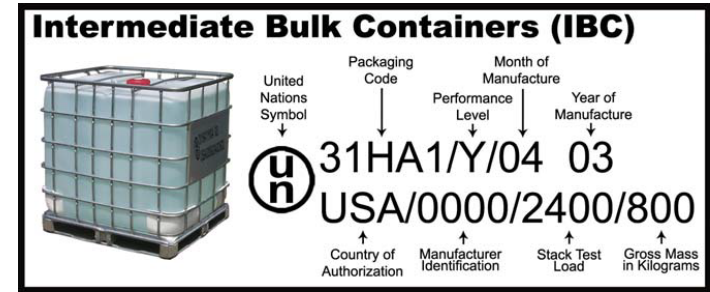
- *This module does not meet the DOT training requirements for a HAZMAT employee*





# DOT HAZMAT Performance Oriented Packaging (POP)

- This is **ONLY** to give some insight into DOT HAZMAT Performance Oriented Packaging (POP)
  - There is separate training for those who need it
  - Still, it give a sense of what's involved



# Interpreting Markings §§178.502 and 178.503

**United Nations Symbol:** For embossing metal receptacles, the letters UN may be applied in place of the symbol.

**Packaging Code:** Designates the type of packaging and material of construction. A letter "W" designates associate administrator approval. A letter "V" designates "variation" packaging.

**Performance Level:** Identifies the performance standard for successful testing of packaging.

- X - For packagings meeting **Packing Group I, II and III tests.**
- Y - For packagings meeting **Packing Group II and III tests.**
- Z - For packagings meeting **Packing Group III tests.**

**Specific Gravity:** Specific gravity for which the packaging design type has been tested. The specific gravity does not exceed 1.2, the designation may be omitted.

**Gross Mass:** Packaging type tested for maximum gross mass in kilograms.

**S:** Designates that the packaging is intended to contain solids or inner packaging.

**Hydrostatic Test Pressure:** Internal Hydrostatic Test Pressure in Kilopascals. Test not required for inner packaging of combination packaging.

**Year of Manufacture:** Last two digits of year of manufacture. Plastic drums and jerricans (1H and 3H) must be marked with the month of manufacture. The month marking is located elsewhere on the package.

**Country of Authorization:** Country designation code indicates where the packaging was manufactured and marked.

**Manufacturer Identification:** Name and address or authorized symbol of packaging manufacturer or certifying agency.

**Minimum Thickness:** For metal or plastic drums, jerricans or the outer packaging of composite packaging intended for reuse or reconditioning.

**R:** Reconditioned packaging.

**L:** Reconditioned packaging having successfully passed a leakproofness test. Test not required for inner packaging of combination packaging.

**Note:** Additional marking requirements for Reconditioned packaging are found in 178.504.

**Additional Requirements for Intermediate Bulk Containers**

## Performance Oriented Packaging

### Non-Bulk Packaging Codes

#### §§178.504 - 178.521

|                                               |                                              |
|-----------------------------------------------|----------------------------------------------|
| 1A1 Steel drum, non-removable head            | 4A Steel box                                 |
| 1A2 Steel drum, removable head                | 4B Aluminum box                              |
| 1B1 Aluminum drum, non-removable head         | 4C1 Wood box, ordinary                       |
| 1B2 Aluminum drum, removable head             | 4C2 Wood box, sift-proof walls               |
| 1D Plywood drum                               | 4D Plywood box                               |
| 1G Fiber drum                                 | 4F Reconstituted wood box                    |
| 1H1 Plastic drum, non-removable head          | 4G Fiberboard box                            |
| 1H2 Plastic drum, removable head              | 4H1 Plastic box, expanded                    |
| 1N1 Metal drum, non-removable head            | 4H2 Plastic box, solid                       |
| 1N2 Metal drum, removable head                | 5H1 Woven plastic bag, unlined or non-coated |
| 2C1 Wooden barrel, bung type                  | 5H2 Woven plastic bag, sift-proof            |
| 2C2 Wooden barrel, slack type, removable head | 5H3 Woven plastic bag, lined                 |
| 3A1 Steel jerrican, non-removable head        | 5H4 Plastic jerrican                         |
| 3A2 Steel jerrican, removable head            | 5L1 Textile jerrican                         |
| 3B1 Aluminum jerrican, non-removable head     | 5L2 Textile jerrican                         |
| 3B2 Aluminum jerrican, removable head         | 5L3 Textile jerrican                         |
| 3H1 Plastic jerrican, non-removable head      | 5M1 Paper jerrican                           |
| 3H2 Plastic jerrican, removable head          | 5M2 Paper jerrican                           |



#### Required Tests for Non-Bulk Packaging

- Drop Test (§178.603)** All packaging design types.
- Leakproofness Test (§178.604)** All packaging design types intended for liquids.
- Hydrostatic Test (§178.605)** All metal, plastic, and composite design types intended to contain liquids.
- Stacking Test (§178.606)** All packaging design types other than bags.
- Cooperage Test (§178.607)** All bung-type wooden barrels.
- Vibration Test (§178.608)** All packaging design types.
- Infectious Substances** See §178.609 for test requirements for packagings for infectious substances.
- Pressure Differential (§173.27)** Packagings intended for air transport.

# DOT definition of packaging ([49 CFR § 171.8](#))

- **Packaging** means a receptacle and any other components or materials necessary for the receptacle to perform its containment function in conformance with the minimum packing requirements of this subchapter.

For radioactive materials packaging, see 173.403 of this subchapter.

- A **package** is the packaging plus its contents.



# Choosing a container: Bulk or Non Bulk

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- Volume of waste to be stored/transported
- Method of transport – efficient packaging/cost effective shipping
- Ease of loading

# DOT definition of Bulk Packaging

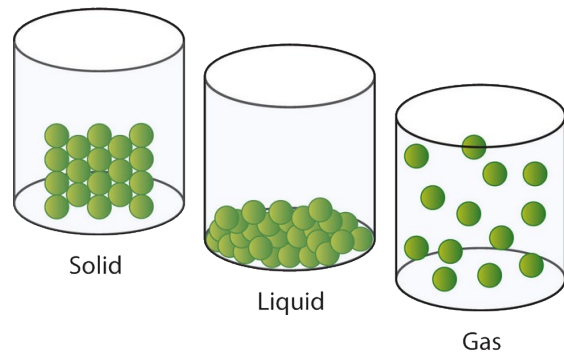
- Packaging, other than a vessel or a barge, including a transport vehicle or freight container, in which hazardous materials are loaded with no intermediate form of containment. A Large Packaging in which hazardous materials are loaded with an intermediate form of containment, such as one or more articles or inner packagings, is also a bulk packaging. Additionally, a bulk packaging has:
  - (1) A maximum capacity greater than 450 L (119 gallons) as a receptacle for a liquid;
  - (2) A maximum net mass greater than 400 kg (882 pounds) and a maximum capacity greater than 450 L (119 gallons) as a receptacle for a solid; or
  - (3) A water capacity greater than 454 kg (1000 pounds) as a receptacle for a gas as defined in § 173.115 of this subchapter.



# Choosing a container:

- *2nd question: what is the physical form?*

- *Solid*
- *Liquid*
- *Contained gas*

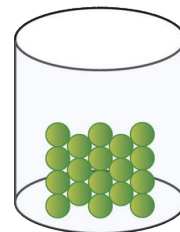


- *Each form has specific requirements*



# Choosing a container: Solids

- Does the waste
  - contain dust/powder that could sift through gaps in packaging
  - have the potential to damage the container (e.g. concrete with rebar)
  - require blocking/bracing to prevent shifting in the container (large, heavy items)
  - chemically react with the container (incompatible)
  - sludge or other high moisture content waste that may release liquids during transport

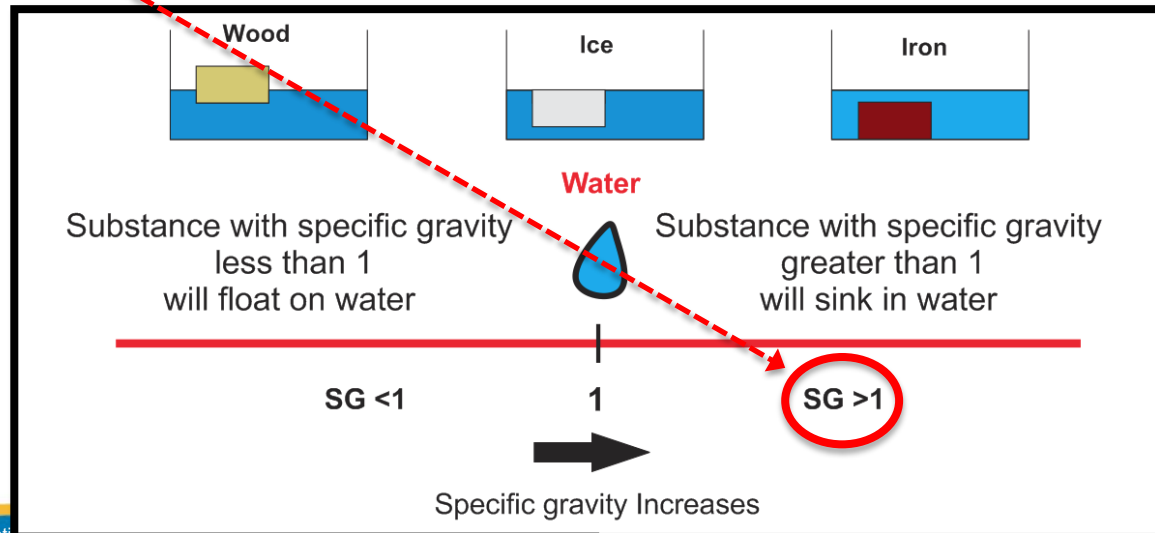


Solid



# Choosing a container: Liquids

- Leak-proof during normal transport
- Specific gravity  $>1$  → DOT containers have specified limits
- Compatible with container



# Choosing a container: Gases

- Any pressurized gas cylinder is a DOT HAZMAT
- Non-empty aerosol cans are pressurized gas cylinders
- Reusable gas cylinders should be returned to the gas plant for disposition
- IG-P409-0212 *Non-Empty Gas Cylinders*



# Compatibility

- FSD-P409-0300 *Waste Characterization and Compatibility*
  - Waste must be chemically compatible with container
  - Heterogeneous waste must not have incompatible components
  - **Examples**
    - Concentrated nitric acid (oxidizer) + organic materials (fuel) = **BOOM!**
    - Organic absorbents (wheat, corn) + water = **fermentation/pressure**



# DOT Requirements

---

- If you are packaging hazardous materials (including waste) you must be trained!
- All wastes are eventually shipped off-site so it is usually best to pick a DOT-approved packaging to start.
- Ensure containers are properly procured - FSD-P409-0500 *Procurement of Waste Packages for Transportation*
- Lab packs are an option for multiple small containers – contact WM-WMS lab pack team.
- All containers must be labeled – labeling for storage may be different than shipping.

# Container closure

- Containers must be closed in accordance with manufacturer's instructions
- May require calibrated tools – e.g., torque wrench
- Usually includes weighing on a calibrated scale
- AP-P409-0702 *Weighing and Final Closure of Waste Packages for Transportation*

$$\text{Gross Weight} = \text{Net Weight} + \text{Tare Weight}$$

Total weight of the container, packaging, and the waste

Weight of the waste

Weight the container and the packaging



# Module 6: Summary

- High-level summary of what was presented:
  - Container compatibility
  - For collection / storage
  - For shipment – DOT
  - Container closure



49 Hazardous  
Materials  
CFR Regulations

*HazMat Transportation*

Regulatory Reference Update Service

Parts 105-180

- Summary of Federal Register Changes
- Changes highlighted in gray
- Cross Reference Table
- Alphabetical Subject Index



# Module 6: Enabling Objectives

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- Recognize the factors that influence selection of an acceptable waste container
- Recognize the DOT requirements for waste packaging







# Module 7: Waste Accumulation and Storage

Waste Management Fundamentals  
for Environmental Professionals

UTrain: 50448

Revision 0; Aug. 2021



# The Modules

- 1: ~~Intro to Waste~~ ✓
- 2: ~~Waste Regulations and Requirements~~ ✓
- 3: ~~Waste Planning~~ ✓
- 4: ~~Waste Generation and Tracking~~ ✓
- 5: ~~Waste Characterization~~ ✓
- 6: ~~Waste Packaging~~ ✓
- 7: **Waste Accumulation and Storage**
- 8: Waste Treatment
- 9: Waste Shipping
- 10: Operating Experience and Lessons Learned

YOU  
are  
HERE

# The Challenge

---

- Multiple types of waste
- Different accumulation and storage requirements for each type
- Different requirements for different types of accumulation and storage areas

*It's challenging to keep track of the requirements for the various types of waste, waste accumulation, and waste storage areas*



# Considerations for Waste Accumulation and Storage

- What are the accumulation and storage requirements for this ***type of waste***?
- What are the accumulation and storage requirements for this ***type of waste accumulation/storage area***?
  - Volume Limits
  - Signs / Postings
  - Documentation
  - Packaging
  - Shipping
  - Containers
  - Labeling or Marking
  - Time Constraints
  - Location
  - Safety Equipment
  - Inspections

# What YOU Should Get Out of This

- Recognize the requirements that apply to waste accumulation and storage
  - Different types of waste
  - Different types of waste storage areas (also waste accumulation areas)
- Given a waste or a waste storage type, recognize where to find resources that detail the waste storage requirements
- Be able to use the resources to correctly identify the waste storage requirements
- Given a scenario, identify if it meets the applicable waste storage requirements
- Recognize the associated training requirements



# Waste Storage and Waste Types



- **Satellite Accumulation Area (SAA)**

- ✓ a designated space for accumulating hazardous and mixed waste
  - the volume of hazardous waste may not exceed 55 gallons **or**
  - the volume of acutely hazardous waste may not exceed 1 quart of liquid or 1 kg (2.2 lbs) of solid

- **Central Accumulation Area (CAA)**

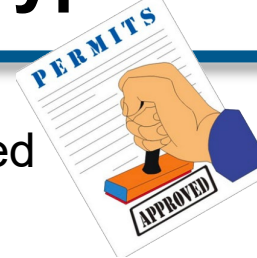
- ✓ A designated space for accumulation of hazardous or mixed waste in containers or tanks
- ✓ The waste may not remain in accumulation area longer than 90 days



# Registered Waste Storage and Waste Types

- **Permitted Storage Units**

- ✓ hazardous waste management units where authorized as listed in LANL's Hazardous Waste Facility Permit
  - ✓ An attachment lists authorized permitted storage units and structures
  - ✓ An attachment lists the authorized waste for each unit



- **New Mexico Special Waste (NMSW)**

- ✓ solid waste that has unique handling, transportation, or disposal requirements



- **Polychlorinated Biphenyl (PCB)**

- ✓ Regulated under the Toxic Substances Control Act (TSCA)
- ✓ Some TSCA waste management requirements differ from RCRA waste requirements
- ✓ LANL requires that PCB waste is tracked by using PCB ID numbers





# Registered Waste Storage and Waste Types

- **Universal Waste**

- ✓ hazardous waste that are commonly generated by a wide variety of establishments
- ✓ EPA eases the storage requirements for this category of waste to encourage alternative method of disposal



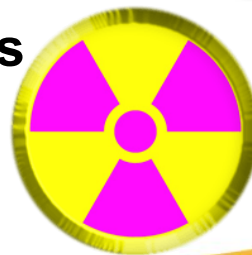
- **Used Oil**

- ✓ oil that has been used and as a result of such use is contaminated by physical or chemical impurities



- **Radioactive Waste Staging or Storage Areas**

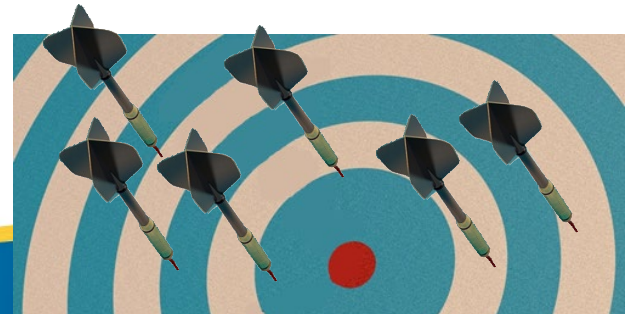
- ✓ LANL must identify LLW, MLLW, TRU, and MTU



# Enabling Objectives

---

- Identify different types of waste
- Identify different types of registered waste storage areas
- Given a type of waste or waste accumulation/storage area, identify the requirements that apply



# Satellite Accumulation Area (SAA)



- A satellite accumulation area (SAA) is a designated space for accumulating hazardous and mixed waste.
- **The volume of hazardous waste may not exceed 55 gallons or the volume of acutely hazardous waste may not exceed 1 quart of liquid or 1 kg (2.2 lbs) of solid.**
- The accumulation area must be located at or near the point of generation and be under the control of the generator/operator of the process generating the waste.



# SAA Requirements

## Simple

- Volume Limits
- Time Constraints
- Inspections
- Signs/Postings
- Documentation
- Packaging
- Shipping

## More Involved

- Controls
- Containers
- Labeling or Marking
- Location
- Safety Equipment

**Volume Limits:** 55-gal. limit for non-acute hazardous or mixed waste; **or** 1-qt. limit for liquid acutely hazardous waste; **or** 1 kg (2.2 lbs.) of solid acutely hazardous waste

**Time Constraints:** If volume limits are exceeded, transfer the waste to a CAA accumulation area, Treatment and Storage Facility (TSF) or a Treatment, Storage and Disposal Facility (TSDF) within three days.

**Inspections:** Written inspections are not required

**Signs/Postings:** The area must have a sign with the words Hazardous Waste Satellite Accumulation Area.

**Documentation:** Characterization documentation must be kept for all waste streams.

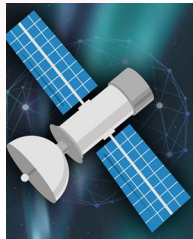
**Packaging:** Hazardous waste must be shipped in a DOT-approved container compatible with the waste

**Shipping:** Contact your WMC for assistance



To be considered “*under the control of the operator of the process generating the waste.*”

- The area must be at the point of generation and have an on-going process associated with it.
  - **Note:** A whole room cannot serve as an SAA.
- SAAs must be posted “**Satellite Accumulation Area.**”
- Locked doors or cabinet locks can be used to prevent unauthorized access to the SAA.
- If an SAA area is located outdoors it must be locked (i.e., adequate fences, gates, or locks.)
- A current list of authorized SAA users must be maintained at the SAA.



- Must be closed at all times except when waste is being added, removed, consolidated or venting of the container to ensure proper operation of the equipment or to prevent dangerous situations, such as build-up of extreme pressure.
- Must be made of - or lined with - materials compatible with the waste.
- Incompatible wastes, or incompatible wastes and materials, must not be placed in the same container.
- Hazardous waste must not be placed in an unwashed container that previously held an incompatible waste or material.
- A container holding a hazardous waste that is incompatible with any waste or other materials accumulated nearby in other containers must be separated from the other materials or protected from them by any practical means (e.g., berms, different cabinets, etc.).
- Must be stored and handled so as to prevent container rupture or leakage.



## NOTES:

- If daily accumulation containers will be used, they must be
  - labeled the same as the other containers (labeling below)
  - moved at the end of the day/shift/process to the registered SAA
  - Closed except when adding or removing waste
  - Documented in a procedure, Integrated Work Documents (IWD), or maintained in an accumulation log





## The marking or label must include:

- The words **Hazardous Waste** and a list of major constituents/an **indication of the hazard(s)**
  - (e.g., containing lead, mercury, ignitable, corrosive, reactive, toxic, etc.);
- **If an excess begins**, i.e., **(a)** volume limits of 55 gallons of non-acute, or **(b)** 1 quart of liquid acute, or **(c)** 1kg of solid acute are exceeded; list the **accumulation start date** (the date the excess began) and **the container must be moved within three days to a CAA or TSDF;**
- The **generator's name** on the container;
- Mixed waste must be additionally marked "**Radioactive Waste;**"



## SAA Location Examples: Same Room/Distinct Location

### CORRECT

Waste  
Generating  
Process

**Rationale:** The SAA is a distinct location in the room.  
**Note:** Examples of distinct locations for compatible waste include a corner area in the room, fume hood, storage cabinet, or work bench.



### POTENTIAL VIOLATION

Waste  
Generating  
Process



**Violation Rationale:** The SAA is not a distinct location since containers of compatible waste are spread around the room.

**Note:** The SAA should generally not be larger than necessary to hold the waste container(s).



# SAA Location Examples: Placement

## CORRECT

Waste  
Generating  
Process

### End of Work Day/Activity

Empty  
Day Use  
Container

**Rationale:** Waste generated and accumulated in a container during the work day/activity was placed in an appropriate SAA by the end of the work day or after the activity ceased during that work day.

**NOTE:** The waste is placed in the SAA by the end of the work day.

Waste  
Container

## POTENTIAL VIOLATION

Waste  
Generating  
Process

### End of Work Day/Activity

Half-Full  
Waste  
Container

**Violation Rationale:** Waste generated the day was not transferred from the point of generation to the SAA by the end of the work day or after the activity ended in that work day. There are now two SAAs for each generating process.

**NOTE:** There is one SAA for each generating process

Half-Full  
Waste  
Container



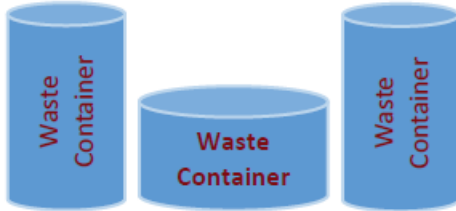
## SAA Location Examples: Multiple Containers

### CORRECT

Waste  
Generating  
Process

**Rationale:** A SAA may hold more than one container. The multiple containers of compatible waste are in close proximity (e.g., within 1 foot).

**Note:** A single SAA may hold containers from one waste generating process or may hold compatible waste from multiple waste generating processes that are located in the same room.

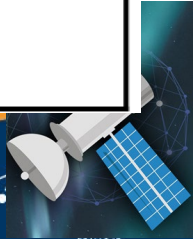


### POTENTIAL VIOLATION

Waste  
Generating  
Process

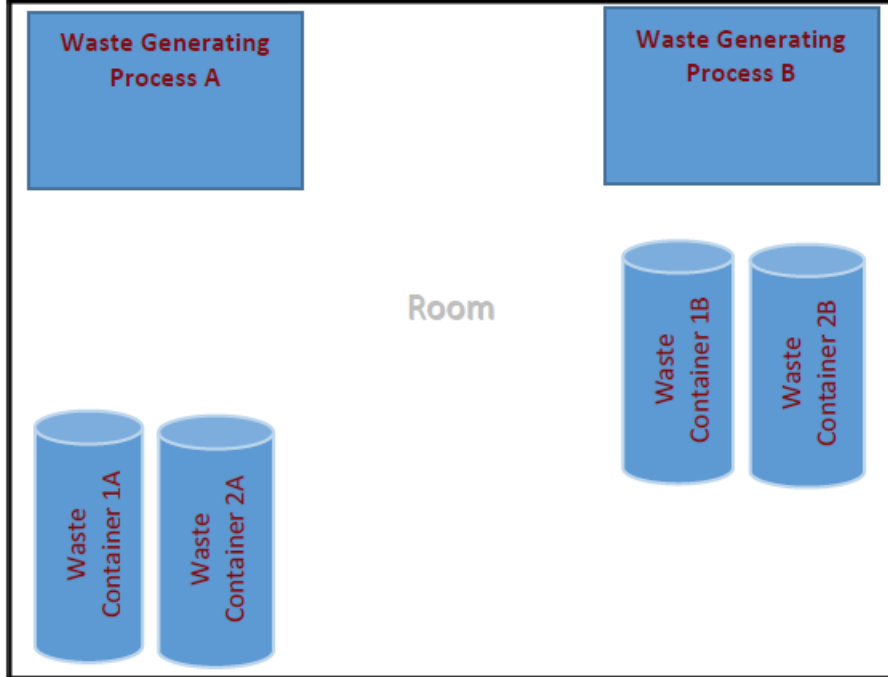
**Violation Rationale:** The containers of compatible waste are not in close proximity (e.g., more than 1 foot apart).

**Note:** Containers in a single SAA must be close together so the location is clearly distinct.



## SAA Location Examples: Generating Process

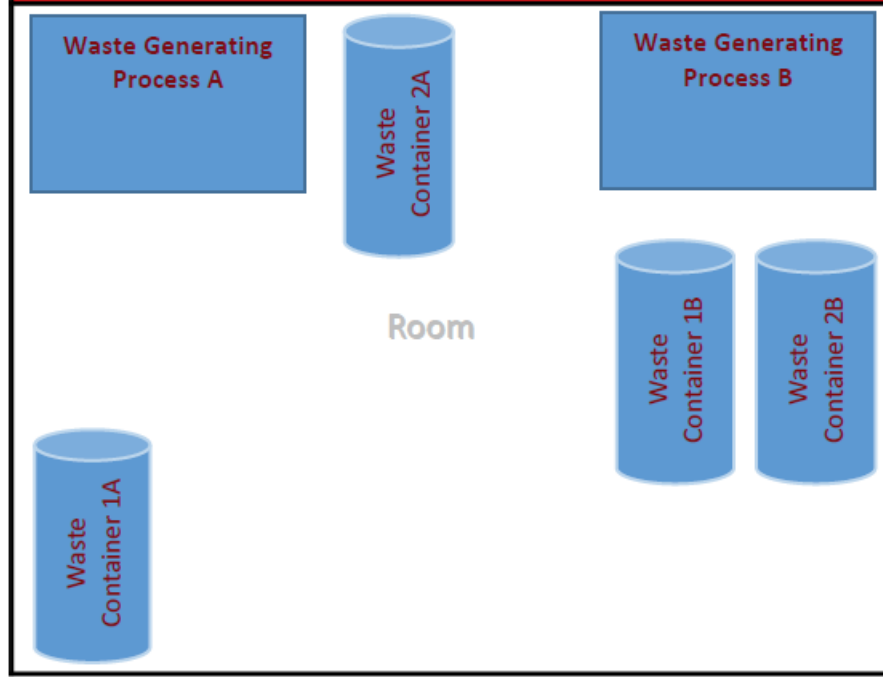
### CORRECT



**Rationale:** All waste from the same waste generating process is kept in the same SAA. If there are two waste generating processes in a room, there can be two SAAs in the room.

**Note:** All of the waste from two waste generating processes in the same room can also be kept in one SAA, if compatible.

### POTENTIAL VIOLATION



**Violation Rationale:** All waste from the same waste generating process is not kept in the same SAA.

**Note:** Waste containers from the same process are placed in the same SAA.

- Must be located at the point of generation.
- The SAA locations will be defined by the following:
  1. Same room/Distinct Location (see Figure 1)
  2. Placement (see Figure 2)
  3. Multiple containers (see Figure 3)
  4. Generating Process (see Figure 4)
- Once the smaller containers are overpacked into a larger container and the overpacked container cannot be stored within the SAA it must be moved to CAA, TSF or TSDF.
- Must be under the control of the operator of the process generating the waste.
- Must have a minimum of 2 feet aisle space in front of the SAA for emergency response access.
- Owner/Operator/Generator must be an active user of the SAA.
- Must be registered with EPC-WMP.
- Legacy/No-Owner waste is not allowed to be stored in an SAA.
- Must have an emergency/site-specific plan, contingency plan and quick reference guide.
- Must have emergency and decontamination equipment available.



## **The SAA must be equipped with the appropriate equipment for types of hazards posed at the site:**

- Internal communications or alarms.
- Telephone or 2-way handheld radio.
- Portable fire extinguishers.
- Adequate water for hoses, foam-producing equipment, or sprinklers or spray systems.
- Eyewash station and safety shower

## **An Industrial Hygiene/Safety person must determine if equipment is required or if equipment is not required**

- This determination must be documented in a memo to file.

## **The equipment must be tested and readiness maintained to ensure it operates as required in time of an emergency.**

- Install and maintain all safety equipment as directed by Industrial Hygiene/Safety.





# Satellite Accumulation Area (SAA)



*The End*

(... of this section)

# Central Accumulation Area (CAA)

Central accumulation(CAA) is a designed space for accumulating hazardous or mixed waste in a container or a tank

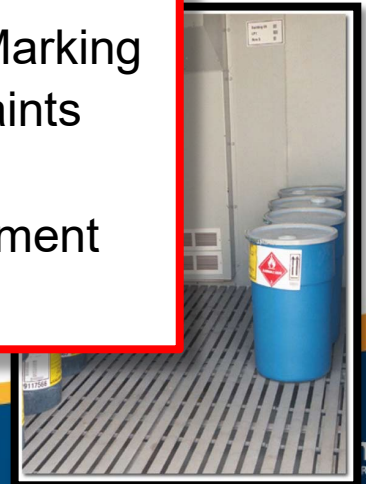
- Considerations:

## Simple

- Volume Limits
- Signs / Postings
- Documentation
- Packaging
- Shipping

## More Involved

- Containers
- Labeling or Marking
- Time Constraints
- Location
- Safety Equipment
- Inspections



# CAA - Simple

## Simple

- Volume Limits
- Signs / Postings
- Documentation
- Packaging
- Shipping



**Volume Limits:** NONE

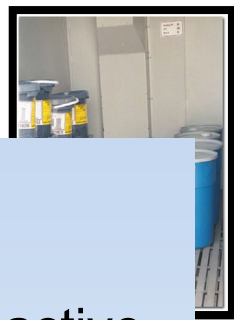
**Signs / Postings:** Must have a sign with the words **Hazardous Waste Central Accumulation Area**.

**Documentation:** Characterization documentation must be kept for all waste streams

**Packaging:** Hazardous waste must be shipped in a DOT-approved container that is compatible with the waste.

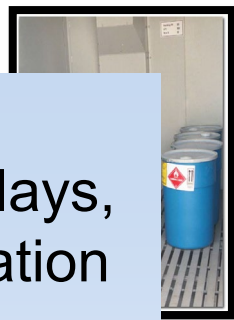
**Shipping:** Contact Waste Management Coordinator (WMC) for assistance.

- Only open when waste is being added, removed or consolidated.
- Made of or lined with materials that are compatible with the waste.
- Incompatible wastes, or incompatible wastes and materials must not be placed in the same container.
- Hazardous waste must not be placed in an unwashed container that previously held an incompatible waste or material.
- A container holding a hazardous waste that is incompatible with any waste or other materials accumulated nearby in other containers must be separated from the other materials or protected from them by any practical means (e.g., berm, different cabinets, etc.).
- Must be stored and handled so as to prevent container rupture or leakage.
- Containers with a concentration of volatile organic compounds (VOCs) greater than 500 ppm by weight must be monitored for emissions unless they meet DOT specifications under 49 CFR Part 178.
- Other exclusions from the emission monitoring requirement can be found in 40 CFR 265.1080.



- Label must include:
  - The words Hazardous Waste.
  - An indication of the hazard(s) (i.e., ignitable, corrosive, reactive, toxic.)
  - Major constituent(s) (i.e., acetone, methanol, toluene, etc.)
  - The accumulation start date (the date the waste was placed or transferred into the CAA.)
  - Mixed waste must be additionally marked “**Radioactive Waste.**”
- EPA hazardous waste numbers prior to transport either on-site or offsite to a permitted treatment, storage and disposal facility.

- Waste must not remain in excess of 90 days. If a container/drum contains waste generated on different days, use the earliest date waste was added as the accumulation start date.
- Submit requests for an extension beyond the 90-day limit to EPC-WMP, **Geri Martinez (geri@lanl.gov)** by day 70.
- An extension can be granted by NMED if needed due to unforeseen, temporary, and uncontrollable circumstances. Provide the following information to EPC-WMP:
  - A written justification as to why the extension is required and what has been done to-date to move the waste; and
  - A written action plan ensuring the waste will be moved before the 30-day extension ends.





- Must have a minimum of 2 ft. aisle spacing.
- Must have an emergency/site-specific plan, contingency plan, and quick reference guide.
- Must be registered with EPC-WMP



- **Must have emergency and decontamination equipment available.**
- **The CAA must be equipped with the appropriate equipment for types of hazards posed at the site:**
  - Internal communications or alarms
  - Telephone or 2-way handheld radio
  - Portable fire extinguishers
  - Adequate water for hoses, foam-producing equipment, or sprinklers or spray systems
  - Eyewash and safety shower
- **An Industrial Hygiene/Safety person must determine if equipment is required or if equipment is not required**
  - This determination must be documented in a memo to file.
- **The equipment must be tested and readiness maintained to ensure it operates as required in time of an emergency.**
  - Install and maintain all safety equipment as directed by Industrial Hygiene/Safety.

- Inspections are required:
  - A minimum of weekly whether or not waste management activities were performed.
  - **NOTE:** daily inspections are not required if wastes are actively managed; i.e., when waste is added, removed, or containers are handled.) (This is a recent change.)
- Use the [CAA Inspection Record Form](#)

## CAA INSPECTION RECORD

| FACILITY: TA Bldg Room                                                                                                        |                                                                                  | Site ID #: | START DATE: |     |     | END DATE: |     |     |  |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------|-------------|-----|-----|-----------|-----|-----|--|
| PART I- Enter condition of the item inspected (OK, NA [Not Applicable], or AR [Action Required]) in column for day inspected. |                                                                                  |            |             |     |     |           |     |     |  |
| ITEM                                                                                                                          | INSPECTED FOR:                                                                   | MON        | TUE         | WED | THU | FRI       | SAT | SUN |  |
| <sup>5</sup> NO USE                                                                                                           | No waste stored                                                                  |            |             |     |     |           |     |     |  |
| <sup>6</sup> LABELS                                                                                                           | Hazardous waste labels on all containers                                         |            |             |     |     |           |     |     |  |
|                                                                                                                               | Hazardous waste characteristics Ignitable, Corrosive, Reactive, Toxic identified |            |             |     |     |           |     |     |  |
| <sup>7</sup> ACCUMULATION START DATE                                                                                          | Present and legible                                                              |            |             |     |     |           |     |     |  |
| <sup>8</sup> NOT EXCEEDING 90 DAYS                                                                                            | Waste has not exceeded 90 days                                                   |            |             |     |     |           |     |     |  |
| <sup>9</sup> COVERS/LIDS OF CONTAINERS                                                                                        | Closed and secured properly                                                      |            |             |     |     |           |     |     |  |
| <sup>10</sup> INTEGRITY (containers structure)                                                                                | Integrity, leakage, deterioration, corrosion, and damage                         |            |             |     |     |           |     |     |  |
| <sup>11</sup> COMPATIBILITY                                                                                                   | Separated according to compatibility                                             |            |             |     |     |           |     |     |  |
| <sup>12</sup> AISLE SPACE/STACKING                                                                                            | Appropriateness and adequacy                                                     |            |             |     |     |           |     |     |  |
| <sup>13</sup> COMMUNICATION EQUIPMENT                                                                                         | Availability and proper operating condition                                      |            |             |     |     |           |     |     |  |
| <sup>14</sup> SPILL/FIRE EQUIPMENT                                                                                            | Present, appropriate, and in proper operating condition                          |            |             |     |     |           |     |     |  |
| <sup>15</sup> EYEWASHES/SAFETY SHOWERS                                                                                        | Proper operating condition                                                       |            |             |     |     |           |     |     |  |
| DATE                                                                                                                          |                                                                                  |            |             |     |     |           |     |     |  |

# Central Accumulation Area (CAA)

*The End*

(... of this section)

# TSF Storage (Permitted Storage Units)

- Permitted storage units are hazardous waste management units where authorized waste is allowed to be stored. Storage must be in containers and in authorized storage structures.
  - see LANL's Hazardous Waste Facility Permit, [Attachment B](#) for a list of authorized waste for each unit and [Attachment J](#) for list of authorized permitted storage units and structures



EPA ID Number **X M 0 8 9 0 0 1 0 5 1 5** OMB# 2050-0024; Expires 05/31/2020

**Attachment B**

| 6. Process Codes and Design Capacities |                 |   |   | B. Process Design Capacity |                     | C. Process Total Number of Units | D. Unit Name              |
|----------------------------------------|-----------------|---|---|----------------------------|---------------------|----------------------------------|---------------------------|
| Line Number                            | A. Process Code |   |   | (1) Amount                 | (2) Unit of Measure |                                  |                           |
| 1                                      | S               | 0 | 1 | 18,500                     | G                   | 001                              | Technical Area 3          |
| 2                                      | T               | 0 | 4 | 3,441                      | U                   | 001                              | Technical Area 3          |
| 3                                      | X               | 0 | 1 | 1,020 or 50                | J* or U             | 002                              | Technical Area 14         |
| 4                                      | X               | 0 | 1 | 1,200 or 50                | J* or U             | 002                              | Technical Area 16         |
| 5                                      | X               | 0 | 1 | 2,000                      | J*                  | 001                              | Technical Area 36         |
| 6                                      | X               | 0 | 1 | 2,000                      | J*                  | 002                              | Technical Area 39         |
| 7                                      | S               | 0 | 1 | 31,500                     | G                   | 001                              | Technical Area 50         |
| 8                                      | T               | 0 | 4 | 3,716                      | U                   | 002                              | Technical Area 50         |
| 9                                      | S               | 0 | 1 | 407,880                    | G                   | 001                              | Technical Area 54, Area L |
| 10                                     | T               | 0 | 4 | 23,160                     | U                   | 001                              | Technical Area 54, Area L |
| 11                                     | D               | 8 | 0 | 1,200                      | Y                   | 001                              | Technical Area 54, Area L |
| 12                                     | S               | 9 | 9 | 600                        | G                   | 001                              | Technical Area 54, Area G |
| 13                                     | S               | 0 | 1 | 4,346,590                  | G                   | 009                              | Technical Area 54, Area G |
| 14                                     | T               | 0 | 4 | 185,280                    | U                   | 008                              | Technical Area 54, Area G |

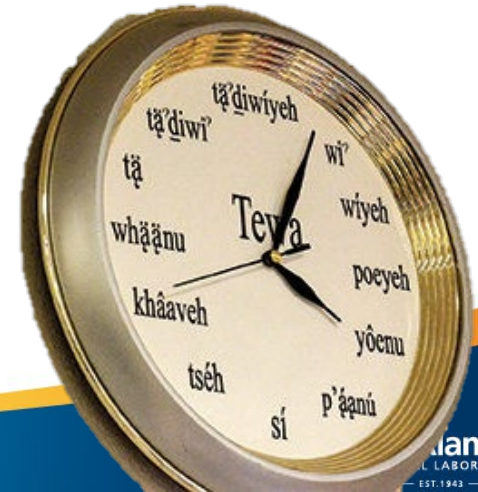
**Attachment J**

| Unit Identifier | Process Codes | Operating Capacity          | General Information                                                                                                              | Type of Unit |
|-----------------|---------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------|
| TA-55-4, K13    | S01           | 2,500 gal                   | Located in basement<br>Referred to as Area 4<br>Total square footage - 208                                                       | Indoor       |
| TA-55-4, B05    | S01           | 3,600 gal                   | Located in basement<br>Referred to as Area 5<br>Non-liquid wastes only<br>Total square footage - 260                             | Indoor       |
| TA-55-4, B45    | S01<br>T04    | 11,000 gal<br>3,441 gal/day | Located in basement<br>Non-liquid wastes only<br>Includes treatment process for macroencapsulation<br>Total square footage - 788 | Indoor       |
| TA-55-4, B13    | S01           | 4,950 gal                   | Located in basement<br>Non-liquid waste only<br>Total square footage - 495.83                                                    | Indoor       |
| TA-55-4, G12    | S01           | 5,225 gal                   | Located in basement<br>Non-liquid waste only                                                                                     | Indoor       |

# TSF Storage – Posting/Markings



- Warning signs must be located at each unit that warn against prohibited entry in two languages (English and Spanish) or three languages (Tewa, English and Spanish) when bordering tribal land.
- Each unit must have established lines of demarcation that identify the boundaries of the unit.



# TSF Storage – Volume

- Check LANL's Hazardous Waste Facility Permit, Attachment J for storage capacity of each permitted unit.

Los Alamos National Laboratory  
Hazardous Waste Permit  
August 2018

**PERMITS**

ED

Attachment J

| Unit Identifier | Process Codes | Operating Capacity          | General Information                                                                                                              | Type of Unit |
|-----------------|---------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------|
| TA-55-4, K13    | S01           | 2,500 gal                   | Located in basement<br>Referred to as Area 4<br>Total square footage - 208                                                       | Indoor       |
| TA-55-4, B05    | S01           | 3,600 gal                   | Located in basement<br>Referred to as Area 5<br>Non-liquid wastes only<br>Total square footage - 260                             | Indoor       |
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| TA-55-4, B13    | S01           | 4,950 gal                   | Located in basement<br>Non-liquid waste only<br>Total square footage - 495.83                                                    | Indoor       |
| TA-55-4, G12    | S01           | 5,225 gal                   | Located in basement<br>Non-liquid waste only                                                                                     | Indoor       |

# TSF Storage – Container Requirements



- Containers must be closed when waste is not being added or removed.
- Containers must be made of or lined with materials that are compatible with the waste.
- Containers must be stored and handled so as to prevent container rupture or leakage.
- Containers not in good condition (e.g., damaged or rusted) or leaking must be transferred to a container in good condition within 24 hours.
- Containers with a concentration of volatile organic compounds (VOCs) greater than 500 ppm by weight must be monitored for emissions unless they meet DOT specifications under [49 CFR Part 178](#). Other exclusions from the emission monitoring requirement can be found in [40 CFR 264.1080\(b\)](#).
- Containers must be tracked by location within the permitted unit and as moved to other units.



# TSF Storage – Container Requirements

- Containers must have a minimum aisle space and emergency egress of 2 ft.
- Oversized items may be wrapped in plastic two times if they cannot be containerized.
- Containers or tanks of ignitable or reactive waste must not have sources of open flames in, on, or around the container.
- Containers equal to or greater than 30 gallons can be stacked up to 3 high if palletized and banded.
- Containers of ignitable and reactive wastes can be stacked no more than 2 drums high.
- Containers must be elevated or otherwise protected from contact with accumulated liquids.
- Containers with free liquids must have adequate secondary containment to contain the volume of the largest container or 10% of the total volume of all waste containers.



# TSF Storage – Labels

- Containers must be labeled “Hazardous Waste” and list the generator’s name and address.
- Containers must be marked with the date it was placed in storage.
- Containers must have EPA Hazardous Waste Number(s) associated with waste.
- Containers must be labeled with an indication of the hazards of the contents (e.g., “ignitable”, “corrosive”, “toxic” or “reactive”).
- Containers holding free liquids must be labeled “Free Liquids.”
- Containers holding mixed waste must be labeled **“Radioactive.”**



# TSF Storage – Time Limits

- Containers must not be stored beyond one year from the date it was first placed in storage.
- For containers of mixed waste (radioactive and hazardous) that will be in storage beyond one year, waste generators must notify the **STP Manager** at least three months prior to the waste exceeding its 1-year accumulation start date.

Name            Avril D. Millensted  
Organization   [EPC-WMP: WASTE MANAGEMENT PROGRAMS](#)  
Email           [millensted@lanl.gov](mailto:millensted@lanl.gov)  
Work Phone    +1 505 665 3350

**STP Manager**



# TSF Storage – Segregation

- Containers of ignitable or reactive waste must be segregated, and protected from sources of ignition or reaction such as cutting, welding, frictional heat, sparks (e.g., static, electrical, mechanical), spontaneous ignition, and radiant heat.
- Requirements for ignitable, reactive or incompatible waste. Reactions that could lead to reactions or cause the following to occur must be prevented:



# TSF Storage – Segregation

- generation of extreme heat, pressure, fire, explosions, or violent reactions;
- production of uncontrolled toxic mist, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment;
- production of uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions;
- damage to the structural integrity of the container, tank, permitted unit, or other structure associated with the permitted unit; and
- threats to human health or the environment.:



# TSF Storage – Safety

- See the LANL Hazardous Waste Facility Permit, Attachment D for the list of all required equipment at the permitted unit.
- Ensure that equipment is tested, maintained and accessible.
- Repair of equipment or damage within the unit must be repaired or mitigated within 24 hours of discovery:
  - Backup equipment, safety precautions, and work-arounds must be put in place and documented within the 24 hours in the operating record.
  - Missing or nonfunctioning equipment must be clearly marked, a substitute provided, and training of use of substitute equipment must occur, if appropriate, and be documented.



# TSF Storage – Safety

- Ensure that each permitted unit's fire suppression system is compatible with the hazardous waste being stored or treated at the permitted unit.
- Maintain adequate clearance around fire hydrants at permitted units.
- Ensure appropriate lightning protection is provided for all storage and treatment units that manage ignitable and reactive waste.
- Confine smoking and open flames to designated areas that are a minimum of 50 feet from areas where ignitable or reactive wastes are handled.
- Use only non-sparking tools when managing hazardous waste containers that contain ignitable or reactive wastes.
- Ensure spills are cleaned up and managed appropriately





# TSF Storage – Inspection



- Inspect the treatment and storage facility (TSF) weekly or on any day waste is actively managed using the [Inspection Record Form](#) (IRF).
- Perform inspections of internal communication, alarm system devices, fire protection equipment, spill control equipment and decontamination equipment to ensure its proper operation in the event of an emergency.

| HAZARDOUS AND MIXED WASTE FACILITY INSPECTION RECORD FORM                                                                                                                                                         |                                                                            |                         |     |                                            |     |                          |     |                        |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------|-----|--------------------------------------------|-----|--------------------------|-----|------------------------|--|
| <sup>1</sup> FACILITY:                                                                                                                                                                                            |                                                                            | <sup>2</sup> Site ID #: |     | TREATMENT, STORAGE, OR DISPOSAL UNIT (TSD) |     | <sup>3</sup> START DATE: |     | <sup>4</sup> END DATE: |  |
| <input type="checkbox"/> Containers <input type="checkbox"/> Landfill <input type="checkbox"/> Chemical Treatment <input type="checkbox"/> Tank <input type="checkbox"/> Miscellaneous Unit (OIB/OD, Cementation) |                                                                            |                         |     |                                            |     |                          |     |                        |  |
| PART I- Enter condition of the item inspected (i.e. OK, NA [Not Applicable], or AR [Action Required]) in column for day inspected.                                                                                |                                                                            |                         |     |                                            |     |                          |     |                        |  |
| ITEM                                                                                                                                                                                                              | INSPECTED FOR:                                                             | MON                     | TUE | WED                                        | THU | FRI                      | SAT | SUN                    |  |
| All TSDs                                                                                                                                                                                                          |                                                                            |                         |     |                                            |     |                          |     |                        |  |
| <sup>6</sup> NO UNIT USE                                                                                                                                                                                          | No waste stored                                                            |                         |     |                                            |     |                          |     |                        |  |
| <sup>7</sup> NO WASTE HANDLING                                                                                                                                                                                    | No waste handled/treated (see instructions)                                |                         |     |                                            |     |                          |     |                        |  |
| <sup>8</sup> COMMUNICATIONS EQUIPMENT                                                                                                                                                                             | Availability and proper operating condition                                |                         |     |                                            |     |                          |     |                        |  |
| <sup>9</sup> WARNING SIGNS                                                                                                                                                                                        | Posted, legible, and bilingual                                             |                         |     |                                            |     |                          |     |                        |  |
| <sup>10</sup> SECURITY                                                                                                                                                                                            | Good condition of fences, gates, locks, and other access control equipment |                         |     |                                            |     |                          |     |                        |  |
| <sup>11</sup> WORK SURFACES/ FLOORS/ROADS                                                                                                                                                                         | Absence of conditions that could lead to an accident or spill              |                         |     |                                            |     |                          |     |                        |  |
| <sup>12</sup> SPILL/FIRE EQUIPMENT                                                                                                                                                                                | Present, appropriate, and in proper operating condition                    |                         |     |                                            |     |                          |     |                        |  |
| <sup>13</sup> EYEWASHES/ SAFETY SHOWERS                                                                                                                                                                           | Proper operating condition                                                 |                         |     |                                            |     |                          |     |                        |  |
| <sup>14</sup> WIND SOCK                                                                                                                                                                                           | Proper operating condition and no damage                                   |                         |     |                                            |     |                          |     |                        |  |
| <sup>15</sup> SECONDARY CONTAINMENT                                                                                                                                                                               | Integrity- No standing water/waste, erosion, or other signs of a spill     |                         |     |                                            |     |                          |     |                        |  |
| <sup>16</sup> (UN)LOADING AREA                                                                                                                                                                                    | No spills or deterioration                                                 |                         |     |                                            |     |                          |     |                        |  |

# TSF Storage – Documentation/Records



- Most recent [contingency plan](#) must be located at each unit.
- Characterization documentation shall be kept and shall be available for inspection at the facility.
- IRFs must be kept by the facility for the life of the facility

Los Alamos National Laboratory  
Hazardous Waste Permit  
June 2019

TABLE D-1  
TA-50  
EMERGENCY EQUIPMENT

## FIRE CONTROL EQUIPMENT

- **FIRE EXTINGUISHERS**

Description of General Capabilities

The fire extinguishers are portable, manually operated units and may be used by any employee in case of fire. They consist of Class ABC or BC rated.

Locations

2 fire extinguishers are located in TA-50-69, Indoor Unit (Room 102)

1 fire extinguisher is located at the TA-50-69, Outdoor Unit

- **FIRE ALARM PULL BOXES CONNECTED TO THE EMERGENCY OPERATIONS SUPPORT CENTER**

Description of General Capabilities

Fire alarms may be activated by any employee in the event of fire to notify the Emergency Operations Support Center. Upon activation, fire alarm horns and strobes provide audible and visual signals for personnel notification. The fire alarm is a pulsing sound.

Locations

Three fire alarm pull stations are located in the TA-50-69, Indoor Unit. Personnel working at the TA-50-69, Outdoor Unit may use the pull stations at TA-50-69 in the event of a fire.

- **AUTOMATIC FIRE SUPPRESSION SYSTEM**

Description of General Capabilities

# TSF Storage (Permitted Storage Units)



- Permitted storage units are hazardous waste management units where authorized waste is allowed to be stored. Storage must be in containers and in authorized storage structures.
  - see LANL's Hazardous Waste Facility Permit, [Attachment B](#) for a list of authorized waste for each unit and [Attachment J](#) for list of authorized permitted storage units and structures

*The End*  
(... of this section)

# New Mexico Special Waste

---

New Mexico Special Waste (NMSW) is a solid waste that has unique handling, transportation, or disposal requirements to assure protection of the environment and the public health, welfare and safety.



# New Mexico Special Waste – It Includes:

- treated formerly characteristic hazardous wastes (**TFCH**);
- **regulated asbestos waste**;
- **ash** (except ash produced by a law enforcement pharmaceutical incinerator from the incineration of household pharmaceutical waste);
- **sludge** (except sludge that is land applied under 40 CFR Part 503 as intermediate or final cover at a landfill and meets the requirements of Subpart B of 40 CFR Part 503) industrial solid waste that, unless specially handled or disposed, may harm the environment or endanger the public health or safety;
- **spill of a chemical substance or commercial product** that, unless specially handled or disposed, may harm the environment or endanger the public health or safety; and
- **Petroleum contaminated soils (PCS)** that have a sum of benzene, toluene, ethylbenzene, and xylene isomer concentrations of greater than 50 mg/kg, or benzene individually greater than 10 mg/kg, or a total petroleum hydrocarbon concentration of greater than 100 mg/kg;
- **infectious waste.**



# New Mexico Special Waste (NMSW)

---

## Simple

- Time Constraints
- Inspections
- Location
- Signs/Posting
- Documentation
- Shipping

## More Involved

- Container Labeling
  - ✓ Add'l for PCS only
  - ✓ Add'l for Asbestos only
  - ✓ Add'l for Infectious Waste
- Packaging



# New Mexico Sp

**Time Constraints:** Waste must not remain in storage in excess of 90 days. **NOTE:** If the 90 days will be exceeded please call **7-6259**

## Simple

- Time Constraints
- Inspections
- Location
- Signs/Posting
- Documentation
- Shipping

**Inspections:** Not required

**Location:** Special Waste Area (SWA)  
Must be registered with EPC-WMP

**Signs/Postings:** The area must have a sign with the words **Special Waste**

**Documentation:** Characterization documentation must be kept by the generator for all waste streams

**Shipping:** If disposed in New Mexico, the waste must be placed in a landfill licensed to dispose NMSW. When shipped in New Mexico, the waste must be accompanied by a NMSW Manifest.

**Contact your WMC for assistance**



Each container must have a [NMSW Label](#), which includes:

- The words **New Mexico Special Waste**
- A list of container **contents** and their **hazards** (e.g., inhalation, ingestion, dermal or other hazards identified in documents such as Safety Data Sheets).
- The container must be labeled with the **date the container is deemed full and placed into storage.**
- The **name and phone number of the generator.**

| NEW MEXICO SPECIAL WASTE<br>Los Alamos National Laboratory<br>P.O. Box 1663, Los Alamos, NM 87545 |                                                              |                                      |                                           |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------|-------------------------------------------|
| <b>CONTENTS</b>                                                                                   |                                                              |                                      |                                           |
| <input type="checkbox"/> Asbestos                                                                 | <input type="checkbox"/> Infectious Waste                    | <input type="checkbox"/> TFCH Waste  | <input type="checkbox"/> Industrial Waste |
| <input type="checkbox"/> Petroleum Contaminated soil                                              | <input type="checkbox"/> Spilled chemical/Commercial product |                                      |                                           |
| <input type="checkbox"/> Ash                                                                      | <input type="checkbox"/> Sanitary Sludge                     | <input type="checkbox"/> Other _____ |                                           |
| <b>HAZARDS</b>                                                                                    |                                                              |                                      |                                           |
| <input type="checkbox"/> Dermal                                                                   | <input type="checkbox"/> Ingestion                           | <input type="checkbox"/> Inhalation  |                                           |
| <input type="checkbox"/> Other _____                                                              |                                                              |                                      |                                           |
| <b>Generator</b>                                                                                  |                                                              | <b>Phone</b>                         |                                           |
| Date placed into Storage                                                                          |                                                              | Awaiting Transportation              |                                           |





## Additional labeling for PCS only:

- The container must be labeled with **two dates**:
  - The date the container is deemed full and placed into storage (initial date.)
  - The date the characterization is complete based on analytical data (final date.)
- In some cases (e.g., acceptable knowledge) the initial and final date may be the same.
  - Every container stored must at least be labeled with the initial date (i.e., when it was deemed full).



## **Additional labeling for Asbestos waste only:**

- Individual bags and/or asbestos-containing dumpsters must also be labeled with the following:

**DANGER**

**CONTAINS ASBESTOS FIBERS**

**MAY CAUSE CANCER**

**CAUSES DAMAGE TO LUNGS**

**DO NOT BREATHE DUST**

**AVOID CREATING DUST**

- Labels must be printed in both **English and Spanish.**

## **Additional labeling for Infectious waste only:**

- Bags used to contain infectious waste must be labeled with the words Biohazard, Biological Hazard or have the Biohazard Symbol (see 29 CFR 1910.145(f)(4)).
- Rigid containers must be labeled Biomedical Waste or Infectious Waste or they may be labeled in the same manner as bags (see above).





- Regulated asbestos waste must be wetted sufficiently to prevent fiber release (see [LANL P101-23](#)).
- Packaging of all asbestos waste must consist of one of the following:
  - A plastic bag of 6-mil or thicker, sealed in such a way that it is leak-proof and the amount of void space or air in the bag is minimized.
  - Double bagged, using plastic-lined cardboard containers or plastic-lined metal containers.
  - Asbestos waste slurries may be packaged in leak-proof drums if they are too heavy for the plastic bag containers or may be transported in vacuum trucks.
  - Pipes or other facility components that are removed as sections without first removing the asbestos must be wrapped in a minimum of 6-mil plastic sufficient to prevent asbestos fibers from escaping.
- The exterior of asbestos packages must be free of asbestos. Contaminated packages must be overpacked.
- For all other packaging of special wastes contact your WMC.

# New Mexico Special Waste – It Includes:

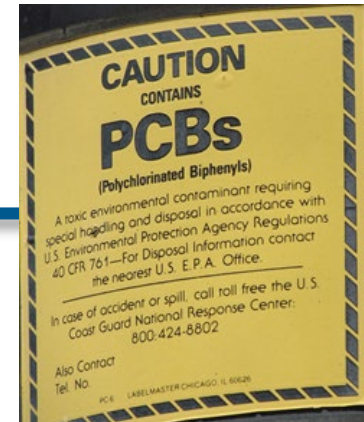
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New Mexico Special Waste (NMSW) is a solid waste that has unique handling, transportation, or disposal requirements to assure protection of the environment and the public health, welfare and safety.



# Polychlorinated Biphenyl (PCB)

- Regulated under the Toxic Substances Control Act (TSCA)
- PCB waste can include, but is not limited to, **voltage regulators, vacuum pumps, oils, fluorescent light ballasts, spill cleanup debris, soil, hydraulic systems, capacitors, transformers, rags, protective equipment, and insulated electrical wiring with tar-impregnated cloth or paper insulation**
- Generators should be aware that some TSCA waste management requirements differ from RCRA waste requirements. LANL requires that PCB waste (items, containers, etc.) be tracked by using PCB ID numbers. **Include a date for the out of service date for items like ballasts and transformers**
- Region 6 EPA may grant an extension to store PCB waste beyond the one-year storage limit if a written request is submitted 30 days before the end of the one-year time period



|              |                                                          |
|--------------|----------------------------------------------------------|
| Name         | John M. Valdez                                           |
| Organization | <a href="#">EPC-WMP: WASTE MANAGEMENT PROGRAMS</a>       |
| Email        | <a href="mailto:jmvaldez@lanl.gov">jmvaldez@lanl.gov</a> |
| Work Phone   | +1 505 667 0633                                          |
| Cell Phone   | <a href="tel:+15055002653">+1 505 500 2653</a>           |

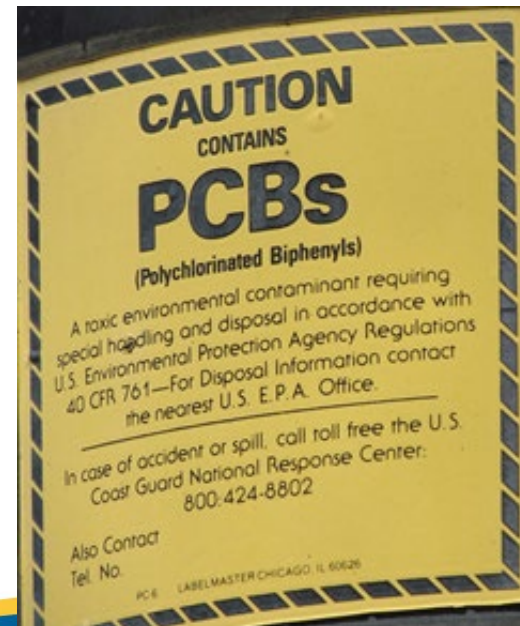
**Contact for PCBs**



# PCB Storage Types

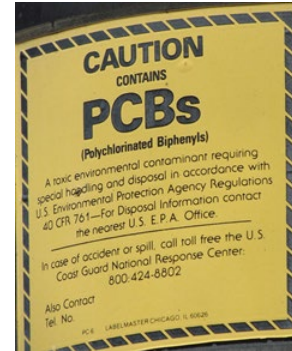
- Rules for PCB storage vary depending on the **PCB Storage Type**
  - **Temporary**
  - **General Storage**
  - **RCRA-permitted TSDF**
  - **PCB Remediation Area**
  - **Fluorescent light ballasts**
    - Regulated as PCB bulk product waste
- PCB Inspection Form

Next  
Slides



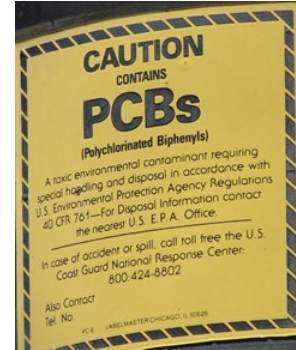
# Storage Requirements for PCB-Contaminated Materials

| Storage Type | Storage Length | Site Req's                                                                                                                                       | Labeling                                                                                                                                                                                                                                                                                                                                                                           | Register? | Sign? |
|--------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|
| Temporary    | 30 Days        | Spill Control and Countermeasures Compliance (SPCC) Plan for 50 ppm or greater PCB liquids; leaking items in container with sufficient absorbent | <ul style="list-style-type: none"> <li>Marked PCBs</li> <li>PCB Identification Number</li> <li>PCB radioactive containers must also be labeled <b>"radioactive"</b></li> <li>The outer container must also be marked with the date the waste was placed into storage or taken out of service. (We have one year to send to TSDF after taken out of service (OOS date)).</li> </ul> | No        | Yes   |



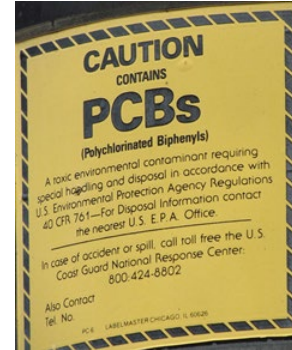
# Storage Requirements for PCB-Contaminated Materials

| Storage Type    | Storage Length | Site Req's                                                            | Labeling                                                                                                                                                                                                                                                                                                                                                                           | Register? | Sign? |
|-----------------|----------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|
| General Storage | 90 Days        | Secondary Containment, Stored Items inspected every 30 days for leaks | <ul style="list-style-type: none"> <li>Marked PCBs</li> <li>PCB Identification Number</li> <li>PCB radioactive containers must also be labeled <b>"radioactive"</b></li> <li>The outer container must also be marked with the date the waste was placed into storage or taken out of service. (We have one year to send to TSDF after taken out of service (OOS date)).</li> </ul> | Yes       | Yes   |



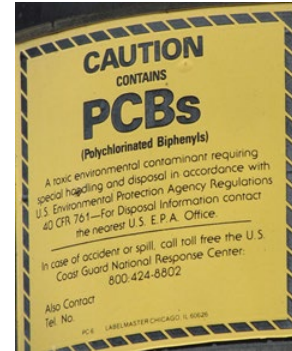
# Storage Requirements for PCB-Contaminated Materials

| Storage Type                                                   | Storage Length                   | Site Req's                                            | Labeling                                                                                                                                                                                                                                                                                                                                                                           | Register? | Sign? |
|----------------------------------------------------------------|----------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|
| Permitted RCRA Treatment, Storage and Disposal Facility (TSDF) | *<br><br>* Per TSDF requirements | TSDF requirements<br>(Above the 100- year flood plan) | <ul style="list-style-type: none"> <li>Marked PCBs</li> <li>PCB Identification Number</li> <li>PCB radioactive containers must also be labeled <b>"radioactive"</b></li> <li>The outer container must also be marked with the date the waste was placed into storage or taken out of service. (We have one year to send to TSDF after taken out of service (OOS date)).</li> </ul> | Yes       | Yes   |



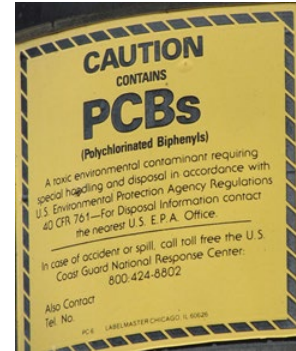
# Storage Requirements for PCB-Contaminated Materials

| Storage Type          | Storage Length | Site Req's                                                                                         | Labeling                                                                                                                                                                                                                                                                                                                                                                           | Register? | Sign? |
|-----------------------|----------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|
| PCB Remediation Waste | 180 Days       | Covered, lined; protected from wind dispersal; protected from rainfall run-on; leachate collection | <ul style="list-style-type: none"> <li>Marked PCBs</li> <li>PCB Identification Number</li> <li>PCB radioactive containers must also be labeled <b>"radioactive"</b></li> <li>The outer container must also be marked with the date the waste was placed into storage or taken out of service. (We have one year to send to TSDF after taken out of service (OOS date)).</li> </ul> | Yes       | Yes   |



# Storage Requirements for PCB-Contaminated Materials

| Storage Type                                                     | Storage Length | Site Req's                                                                                   | Labeling                                                                                                                                                                                                                                                                                                                                                                           | Register? | Sign? |
|------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------|
| Fluorescent light ballasts (regulated as PCB Bulk Product Waste) | 180 Days       | Ballasts must be in covered, labeled containers marked with earliest removal of service date | <ul style="list-style-type: none"> <li>Marked PCBs</li> <li>PCB Identification Number</li> <li>PCB radioactive containers must also be labeled <b>"radioactive"</b></li> <li>The outer container must also be marked with the date the waste was placed into storage or taken out of service. (We have one year to send to TSDF after taken out of service (OOS date)).</li> </ul> | Yes       | Yes   |





# PCB Inspection Form

- Inspected at least every 30 days

Instructions  
(on back of form)

## Polychlorinated Biphenyl (PCB) Waste Management

No: IG-P409-0216

Page 5 of 6

Revision: 0

Effective Date: 04/07/2021

## Inspections

- Items stored in a PCB General Storage Area need to be inspected at least every 30 days [https://adesh2013.lanl.gov/WebDocs/fmra\\_tscs\\_monthly\\_inspection.pdf](https://adesh2013.lanl.gov/WebDocs/fmra_tscs_monthly_inspection.pdf). See FSD-P409-0600, Waste Accumulation and Storage.

## Instruction for Use of the TSCA Storage Area Inspection Record

(Not all items in this section will apply to all facilities. An "NA" [not applicable] is required if the item does not apply.)

- FACILITY:** Location information, including TA, building, and room (if applicable). Other location descriptors may be necessary (e.g., TA-59-3-114 or TA-59-1-S, Dock). See [here](#) for storage area design criteria.
- Site ID Number:** An identification number is assigned to every facility. This allows for ease in identification.
- START DATE:** The date of the actual first working day of the month. Inspections in TSCA Storage Areas should be conducted once a month and meet restrictions in §761.65(b).
- END DATE:** The date of the actual last working day of the month.
- NO USE:** May be checked if no waste was stored. In the situation that this box is checked, the individual responsible for the inspection must only complete this box and the signature section for that day/week.
- STORAGE AREA SIGNS:** Required signs must be legible and prominently posted.
- Floors and other work surfaces at should be inspected for any conditions that could lead to a spill or an accident.
- Storage areas must have spill control equipment that is in accordance with §761.180.
- Secondary containment structures for PCB Articles must be inspected to verify proper operating condition and to ensure adequate capacity. Structures must also be inspected for the presence of standing water or other liquids.
- Run-on and run-off controls, wherever present, must be checked. The integrity should be inspected by looking for signs of damage, erosion, ponding, or any other conditions that could lead to a spill or an accident.
- All containers used for storing PCB Articles must have the cover or lid securely in place. Containers are not considered to be closed until the lid/cover is fastened in the manner the manufacturer originally intended. However, the lid may be off of a container while waste is being placed into or removed from a container.
- All containers and pieces of equipment must be labeled with the PCB mark.

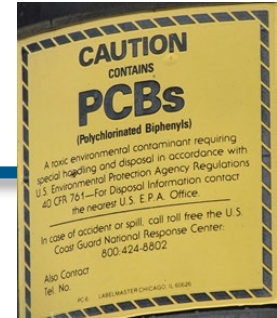
## TSCA STORAGE AREA INSPECTION RECORD

| 1 FACILITY:                                                                                  |                                                                                       | 2 Site ID #: | 3 START DATE: | 4 END DATE: |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------|---------------|-------------|
| Please indicate the condition of the inspection items below using "OK", "✓", "N/A", or "AR." |                                                                                       |              |               |             |
| ITEM                                                                                         | INSPECTED FOR                                                                         |              |               | CONDITION   |
| 5 NO USE                                                                                     | No waste opened, moved, received, or removed; or no waste or PCB Articles were stored |              |               |             |
| 6 STORAGE AREA SIGNS                                                                         | Posted and legible, with PCB M <sub>i</sub> mark visible                              |              |               |             |
| 7 WORK SURFACES/FLOORS                                                                       | Any conditions that could lead to an accident or spill                                |              |               |             |
| 8 SPILL EQUIPMENT                                                                            | Present, appropriate, and in proper operating condition                               |              |               |             |
| 9 SECONDARY CONTAINMENT                                                                      | Standing water/waste, integrity, vegetation, and erosion                              |              |               |             |
| 10 RUN-ON/OFF CONTROL                                                                        | Ponding, integrity, erosion, and damage                                               |              |               |             |
| 11 COVER/LID OF CONTAINERS                                                                   | Closed and secured properly                                                           |              |               |             |
| 12 PCB LABELS                                                                                | Present and in good condition                                                         |              |               |             |
| 13 PCB ID BARCODES                                                                           | Present, unique, and in good condition                                                |              |               |             |
| 14 DATE REMOVED                                                                              | Present on all containers and equipment- 1 year limit for items stored for disposal   |              |               |             |
| 15 DATE OF INTENDED REUSE OR SERVICE                                                         | Present for equipment stored for reuse                                                |              |               |             |
| 16 INTEGRITY (Containers and equipment)                                                      | Integrity, leakage, deterioration, corrosion, and damage                              |              |               |             |
| 17 OUTSIDE PALLETS AND RAISED CONTAINERS                                                     | Any condition that could result in failure                                            |              |               |             |

|                                                                                                                                                                                                    |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 18 Inspector Printed Name                                                                                                                                                                          | Z #  |
| 19 Inspector Signature                                                                                                                                                                             | Date |
| For any AR (Action Required), describe below: action required, action taken, date, and time of action. Attach additional sheets if necessary. If more than one action is required, number each AR. |      |



# Polychlorinated Biphenyl (PCB)



- Regulated under the Toxic Substances Control Act (TSCA)
- PCB waste can include, but is not limited to, **voltage regulators, vacuum pumps, oils, fluorescent light ballasts, spill cleanup debris, soil, hydraulic systems, capacitors, transformers, rags, protective equipment, and insulated electrical wiring with tar-impregnated cloth or paper insulation**
- Generators should be aware that some TSCA waste management requirements differ from RCRA waste requirements. LANL requires that PCB waste (items, containers, etc.) be tracked by using PCB ID numbers
- Region 6 EPA may grant an extension to store PCB waste beyond the one-year storage limit if a written request is submitted 30 days before the end of the one-year time period

THE END

(... of this section)

# Universal Waste

---

- Universal waste regulations streamline the hazardous waste management standards for certain categories of hazardous waste that are commonly generated by a wide variety of establishments.
- EPA eases the storage requirements for this category of waste to encourage alternative method of disposal.



# Universal Waste

- Universal wastes are subject to the universal waste requirements of 40 CFR 273 and include the following streamlined hazardous waste regulations to promote the collection and recycling of universal waste items, which include:
  - **batteries** (such as nickel-cadmium and lithium ion);
  - **mercury-containing equipment**;
  - **discarded lamps** that exhibit a hazardous characteristic (excludes Mercury);
  - **aerosol cans** (nozzle must be removed or other protection device installed to prevent discharge in package) and
  - **pesticides** that have been suspended, recalled and/or that are collected as part of a waste pesticide collection program,
- Note: Universal Wastes must have no radioactive or chemical contamination.

# Universal Waste

**Training:** Universal Waste Area Training.

**Location:** Must be registered with EPC-WMP before the storage of universal waste. Contact your WMC so they can get the site registered

**Volume Limits:** None

**Containers:** Must be closed when waste is not being added or removed. Boxes used for storing lamps must be taped closed and have no holes. Must be made of – or lined with – materials that are compatible with the waste. Must be stored and handled so as to prevent container rupture or leakage..

## Simple

- Training
- Location
- Volume Limits
- Containers
- Labeling
- Time Constraints
- Signs/Postings
- Packaging

# Universal Waste

## Simple

- Training
- Location
- Volume Limits
- Containers
- Labeling
- Time Constraints
- Signs/Postings
- Packaging

**Labeling:** Label must include:

The words **Universal Waste** and a **list of major constituent** (batteries, lamps/bulbs, aerosol cans, mercury containing equipment or pesticides) and the **accumulation start date**.

**Time Constraints:** Waste must not remain in excess of **one year** from the date originally generated.

**Signs/Postings:** The area must have a sign with the words **Universal Waste Accumulation Area**.

**Packaging:** Universal waste must be shipped in a **DOT-approved container** that is compatible with the waste.

# Universal Waste

- Universal waste regulations streamline the hazardous waste management standards for certain categories of hazardous waste that are commonly generated by a wide variety of establishments.
- EPA eases the storage requirements for this category of waste to encourage alternative method of disposal.





# Used Oil (UOA)

---

- **Used Oil** is *“any oil that has been refined from crude oil or any synthetic oil that has been used and as a result of such use is contaminated by physical or chemical impurities.”*







# UOA Requirements

## Simple

- Volume Limits
- Containers
- Labeling
- Time Constraints
- Location
- Inspections
- Signs/Postings
- Shipping

**Volume Limits:** None

**Containers:** Used Oil containers must be closed except when waste is being added or removed. Must be made of or lined with materials that are compatible with the waste. Must be stored and handled so as to prevent container rupture or leakage

**Labeling:** Must include the words **Used Oil**

**Time Constraints:** None

**Location:** If you accumulate 10 gallons or more in a single location maintain a log sheet of origin/generator of the oil. Must be registered with EPC-WMP if storing over 10 gallons of used oil.



# UOA Requirements (2 of 2)

## Simple

- Volume Limits
- Containers
- Labeling
- Time Constraints
- Location
- Inspections
- Signs/Postings
- Shipping

**Inspections:** Inspections are not required

**Signs/Postings:** It is suggested as a Best Management Practice (BMP), although not required, that the area have a sign with the words **Used Oil** and the **name and phone number of the primary user**

**Shipping:** Contact your WMC for assistance



# UOA Requirements (1 of 2)

- **Used Oil** is *“any oil that has been refined from crude oil or any synthetic oil that has been used and as a result of such use is contaminated by physical or chemical impurities.”*



# RAD Staging and Storage Areas

- Low-level waste (LLW), mixed low-level waste (MLLW), transuranic waste (TRU), and transuranic mixed waste (MTRU) all must meet waste package certification requirements before the waste is packaged, shipped, and disposed of
  - **NOTE: MLLW is managed within a CAA (not a rad staging or storage area.)**
- There must be a **Quality Assurance Program**, with accurate **Documentation**, foreseen **Planning of New Radioactive Waste Streams**, and **Removal and Disposal of RAD waste**.
- Storage limitation must be adhered to under the RWMB requirements.
- Facilities that must store LLW in excess of one year must submit a modified RWMB to request a storage extension as specified in P409.

**Note:** Per DOE M 435.1; RWMB extensions are required for LLW containers only.  
TRU waste is not subject to RWMB extension requirements.



# Signs For Rad Waste Staging/Storage

- Rad waste remains in the staging area while the container is


**Note:** collecting waste. Once the container is sealed, it can remain in the staging area for 90 days. After the 90 days, the TRU/LLW can be moved to a registered storage area where it can remain for up to one year.

- If it cannot be shipped prior to a year in storage, an RWMB request must be initiated for the LLW 90 days prior to its one-year storage date.

**Note:** This “collecting (radioactive) waste” in a rad waste staging area is not the same as an accumulation area. There is a tendency to confuse the two but they are different. “**Accumulation Area**” is a RCRA term and those areas are regulated under RCRA.

# Inspection Checklist: Monthly Surveillance

- Radioactive waste facilities must inspect their LLW waste staging and storage areas monthly with **Radioactive Waste Staging and Storage**

|                  |                   |                                                                                   |
|------------------|-------------------|-----------------------------------------------------------------------------------|
| EPC-WMP-FORM-005 | Revision: 0       |  |
| Effective Date:  | Next Review Date: |                                                                                   |

Environment, Safety, Health, Quality, Safeguards, and Security Directorate  
Environmental Protection and Compliance Division  
Waste Management Programs Group  
FORM

## Radioactive Waste Staging and Storage Area Monthly Inspection Form

Author/Subject Matter Expert:

|                     |                          |                          |                                                                     |       |
|---------------------|--------------------------|--------------------------|---------------------------------------------------------------------|-------|
| Name:<br>Eddie Rios | Organization:<br>EPC-WMP | Signature:<br>Eddie Rios | Digitally signed by Eddie Rios<br>Date: 2020.07.14 08:41:17 -06'00' | Date: |
|---------------------|--------------------------|--------------------------|---------------------------------------------------------------------|-------|

Managed by Triad National Security, LLC for the U.S. Department of Energy's NNSA

| RADIOACTIVE WASTE STAGING AND STORAGE AREA MONTHLY INSPECTION FORM                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                               |                          |                          |                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|
| Inspection Date:                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                    | WMC:                                                                                                                                                                                                                                                                                                                          |                          | FOD:                     |                          |
| TA/Building:                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                    | Site ID#:                                                                                                                                                                                                                                                                                                                     |                          | Site Owner:              |                          |
| RWMB (INITIAL)                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                    | RWMB (EXTENSION)                                                                                                                                                                                                                                                                                                              |                          |                          |                          |
| Doc ID:                                                                                                                                                                                                                                                                                                                                      | Expiration Date:                                                                                                                                                                                                                   | Doc ID:                                                                                                                                                                                                                                                                                                                       | Expiration Date:         |                          |                          |
| LANL Waste Management, P409, Section 3.4.3, Radioactive Waste Management Basis, states that LANL must identify LLW, MLLW, TRU and MTRU when it is generated, when there are changes in facility status (i.e., adding storage area, increasing waste volumes, etc.), and when the LLW/MLLW waste is about to exceed the 1 year storage limit. |                                                                                                                                                                                                                                    | LANL Waste Management, P409, Section 3.4.3, Radioactive Waste Management Basis, states that if it is foreseen that LLW cannot be shipped for final disposition within 1 year of waste generation, a request for storage extension must be submitted to EPC-WMP at least 3 months before exceeding the 1 year expiration date. |                          |                          |                          |
| <input type="checkbox"/> STAGING AREA (Sections 1 & 3)                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                    | <input type="checkbox"/> STORAGE AREA (Sections 2 & 3)                                                                                                                                                                                                                                                                        |                          |                          |                          |
| <input type="checkbox"/> Inactive/Removed Site ID <input type="checkbox"/> Active But Not Storing                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                    | <input type="checkbox"/> Inactive/Removed Site ID <input type="checkbox"/> Active But Not Storing                                                                                                                                                                                                                             |                          |                          |                          |
| SECTION 1: STAGING AREA                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                    | YES                                                                                                                                                                                                                                                                                                                           | NO                       | Not Applicable           | Action Required          |
| 1.                                                                                                                                                                                                                                                                                                                                           | Are any of the containers nearing the 90-day staging limit?                                                                                                                                                                        | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| a.                                                                                                                                                                                                                                                                                                                                           | If yes, have steps been taken to move the container(s) into a storage area? (If yes, proceed to Section 3.)                                                                                                                        | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SECTION 2: STORAGE AREA (Not Applicable For TRU Waste)                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                    | YES                                                                                                                                                                                                                                                                                                                           | NO                       | Not Applicable           | Action Required          |
| 1.                                                                                                                                                                                                                                                                                                                                           | Have any of the waste containers exceeded the 1 year storage limit?                                                                                                                                                                | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| a.                                                                                                                                                                                                                                                                                                                                           | If yes, are they on the approved DOE RWMB Extension referenced above? (Note: If the Extension is nearing its expiration date, a "new" RWMB Extension must be submitted 90-days before the expiration date. See P409 requirements.) | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



# Inspection Checklist; Monthly Surveillance

- LLW areas are subject to the **Waste Certification Program**  
**Radioactive Waste Management Surveillance; EPC-WMP-TP-226**

|                                                                                                                                                                                                                                                                                                                                                                               |                             |                                                                                     |                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|--------------------|
| <b>EPC-WMP-TP-226</b>                                                                                                                                                                                                                                                                                                                                                         | Revision: 2                 |  |                    |
| Effective Date: 9/28/2020                                                                                                                                                                                                                                                                                                                                                     | Next Review Date: 9/28/2023 |                                                                                     |                    |
| <p><b>Environment, Safety, Health, Quality, Safeguards, and Security Directorate</b><br/><b>Environmental Protection and Compliance Division</b><br/><b>Waste Management Programs Group</b></p> <p><b>Technical Procedure</b></p> <p><b>Waste Certification Program</b><br/><b>Radioactive Waste Management Surveillance</b></p> <p>Document Owner/Subject Matter Expert:</p> |                             |                                                                                     |                    |
| Name:<br>Clarissa Sisneros                                                                                                                                                                                                                                                                                                                                                    | Organization:<br>EPC-WMP    | Signature:<br>Signature on File                                                     | Date:<br>9/21/2020 |






# Inspection Check

- LLW areas are subject to
- ## Radioactive Waste Management

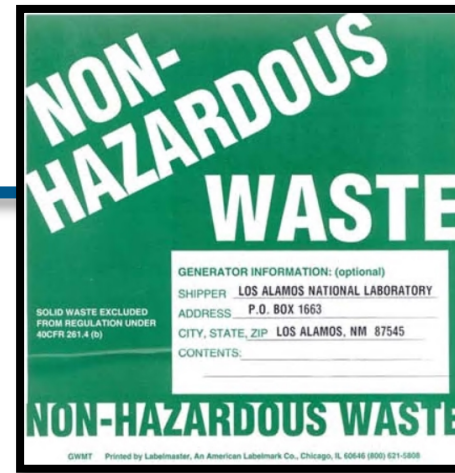
| WASTE CERTIFICATION PROGRAM RADIOACTIVE WASTE STORAGE/STAGING AREA CHECKLIST                                                                                                                             |                         |                            |                          |                          |                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------|--------------------------|--------------------------|--------------------------|
| Facility (Organization):                                                                                                                                                                                 | Radioactive Waste Area: | FOD:                       | Date:                    |                          |                          |
| Site ID#:                                                                                                                                                                                                | Site Owner:             | Certifying Official (WMC): |                          |                          |                          |
| <input type="checkbox"/> No Concerns <input type="checkbox"/> With Concerns <input type="checkbox"/> Inactive/Removed <input type="checkbox"/> Active But Not Storing <input type="checkbox"/> Comments: |                         |                            |                          |                          |                          |
| QUESTIONS (If any findings or comments, please use the comments section below. If additional sheets are used, please indicate how many in the comments section).                                         |                         |                            | YES                      | NO                       | N/A                      |
| 1. Is the facility RWMB report accurate with respect to the radioactive waste management facilities and activities observed?                                                                             |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Are all radioactive waste staging and storage areas registered and are sites accurate in Waste Areas Tracking System?                                                                                 |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Are all radioactive waste staging and storage areas posted with registered site ID#?                                                                                                                  |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Does the facility ensure that wastes certified for transfer into storage meet the identified WAC?                                                                                                     |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Are the waste characterization methods adequate (Waste Characterization Tool) and adequately documented?                                                                                              |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Does the overall radioactive waste management system function to maintain waste certification?                                                                                                        |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Are wastes formally designated and do records indicate the WCO certifies waste for storage and shipment?                                                                                              |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Is waste management documentation readily available for Waste Certification Program audit?                                                                                                            |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Does the documentation include:                                                                                                                                                                       |                         |                            |                          |                          |                          |
| a. Waste Profile Forms (waste generation)                                                                                                                                                                |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Waste Characterization (Current Analytical Data and/or AK)                                                                                                                                            |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Approved Chemical Waste Disposal Requests (storage certification)                                                                                                                                     |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Shipment Manifests (shipment certification)                                                                                                                                                           |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Are records retained for the period required by DOE?                                                                                                                                                 |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Are monthly inspections completed adequately (Radioactive Waste Staging or Storage Tool)?                                                                                                            |                         |                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

|                                                                                                                                                                                                       |                          |                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------|
| EPC-WMP-FORM-004                                                                                                                                                                                      | Revision: 0              |                                  |
| Effective Date:                                                                                                                                                                                       | Next Review Date:        |                                                                                                                   |
| <b>Environment, Safety, Health, Quality, Safeguards, and Security Directorate</b><br><b>Environmental Protection and Compliance Division</b><br><b>Waste Management Programs Group</b><br><b>FORM</b> |                          |                                                                                                                   |
| <b>Waste Certification Program Radioactive Waste Storage/Staging Area Checklist</b>                                                                                                                   |                          |                                                                                                                   |
| Author/Subject Matter Expert:                                                                                                                                                                         |                          |                                                                                                                   |
| Name:<br>Eddie Rios                                                                                                                                                                                   | Organization:<br>EPC-WMP | Signature:<br>Eddie Rios<br><small>Digitally signed by Eddie Rios<br/>Date: 2020.07.14<br/>15:48:32 -0600</small> |
| Date:                                                                                                                                                                                                 |                          |                                                                                                                   |

# Other Labels

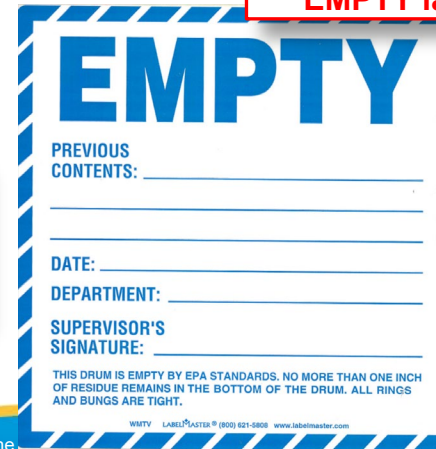
- Non-hazardous Waste label
- Empty label (on drum or container)
  - **Blue and White label** =  
container has never had any  
**RAD Waste/Material** in it previously
  - **Black and White label** =  
Container that once contained  
**RAD Waste/Material** but is now empty

**EMPTY labels are used if the container is within the boundary of the Accumulation/Storage area.**



A green and white label for non-hazardous waste. The top half is green with the words "NON-HAZARDOUS WASTE" in large white letters. The bottom half is white with a green border and contains the following text: "GENERATOR INFORMATION: (optional)", "SHIPPER: LOS ALAMOS NATIONAL LABORATORY", "ADDRESS: P.O. BOX 1663", "CITY, STATE, ZIP: LOS ALAMOS, NM 87545", "CONTENTS: \_\_\_\_\_". On the left side, it says "SOLID WASTE EXCLUDED FROM REGULATION UNDER 40CFR 261.4 (b)". At the bottom, it says "GWMT Printed by Labelmaster, An American Labelmark Co., Chicago, IL 60648 (800) 621-5888".

**NOTE:**  
There is more than one  
**EMPTY** label format.



A blue and white label for empty containers. The top half is blue with the word "EMPTY" in large white letters. The bottom half is white with a blue border and contains the following text: "PREVIOUS CONTENTS: \_\_\_\_\_", "DATE: \_\_\_\_\_", "DEPARTMENT: \_\_\_\_\_", "SUPERVISOR'S SIGNATURE: \_\_\_\_\_", "THIS DRUM IS EMPTY BY EPA STANDARDS. NO MORE THAN ONE INCH OF RESIDUE REMAINS IN THE BOTTOM OF THE DRUM. ALL RINGS AND BUNGS ARE TIGHT." At the bottom, it says "GWMT LABELMASTER® (800) 621-5888 www.labelmaster.com".

**EMPTY**

# RAD Staging and Storage Areas



- Per P409: *In accordance with DOE O 435.1-1 Chg 2, Radioactive Waste Management, LANL must identify LLW, MLLW, TRU, and MTU:*
  - *when it is generated*
  - *where there are changes in facility status (i.e., adding storage area, increasing waste volumes, etc.)*
  - *When the LW/MLLW is about to exceed the one-year storage limit*
- LANL meets this requirement using Form 2107; *Radioactive Waste Management Basis Report Form (RWMB).*
  - *The Waste Generator or RLM – **NOT the WMC** – must submit the new or updated RWMB*



# Associated Training Requirements (from P409)

## 6.0 TRAINING

*LANL Waste Management*

Rev. 8

## 6.0 TRAINING

Except for office waste, personnel who generate waste at the Laboratory must be trained and qualified. This ensures that the Laboratory meets its regulatory and contractual requirements. Worker's whose training expires, are prohibited from generating waste, treating waste, or working in a waste management accumulation, staging, or storage area until their training is completed. Performance of waste related activities without proper training is a regulatory compliance violation.

Managers are responsible for assigning their personnel to the training curricula identified in Table 6, below.

**Note:** Site-specific training may be required, and directed by responsible line managers.



# Associated Training Requirements (Con't)

**Table 6. Training Requirements**

| Role                           | UTrain Curricula*                                                                                                                                                   |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Waste Generators</b>        | <ul style="list-style-type: none"><li>▪ <u>Curriculum 2810</u>, Waste Generator Training</li><li>▪ <u>Curriculum 10392</u>, WCATS Generator Role Training</li></ul> |
| <b>CAA Workers or Owners**</b> | <ul style="list-style-type: none"><li>▪ <u>Curriculum 293</u>, Central Accumulation Area Worker Training</li></ul>                                                  |
| <b>TSF Workers or Owners**</b> | <ul style="list-style-type: none"><li>▪ <u>Curriculum 256</u>, RCRA Hazardous/Mixed Waste Worker Training</li></ul>                                                 |
| <b>Authorized Users</b>        | <ul style="list-style-type: none"><li>▪ <u>Curriculum 13865</u>, Authorized User</li></ul>                                                                          |

\* Each curriculum includes refresher training as required.

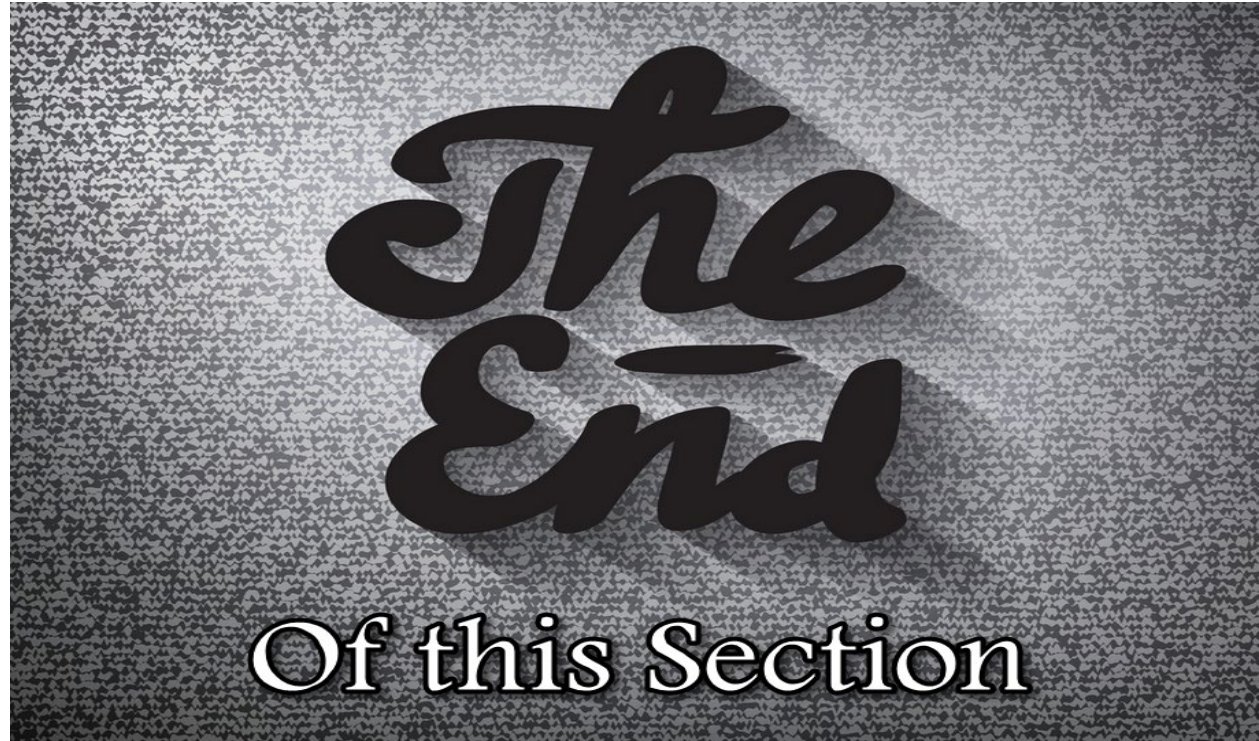
\*\*This RCRA-related training must be completed within 6 months of employment or a new assignment. During this period, workers must work under the supervision of a trained worker.





# Associated Training Requirements (from P409)

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# Registering Waste Accumulation and Storage Areas

- We use the **Waste Area Tracking System** to register, update, and remove:
- SAAs, CAAs, UOAs, TSFs, UWAs, PCBs, SWAs, and rad staging and storage areas.
- Only **Geri Martinez** ([geri@lanl.gov](mailto:geri@lanl.gov)) is allowed to register TSFs.
  - Geri receives information from the permitted team when a TSF has to be registered or removed.
  - WMCs can update the owner info for the TSFs.
- To register, update, and remove rad waste staging and storage areas, contact **Eddie Rios** ([eddierios@lanl.gov](mailto:eddierios@lanl.gov))



# Registering Waste Accumulation and Storage Areas



## Waste Area Tracking System

Application used for tracking and updating waste locations across the lab via waste inspections. The application is used for registering and tracking sites so employees know where waste is stored at the laboratory to easily be identified and inspected. The application also tracks if the waste is active, removed, decommissioned, etc. EPA has regulations how the lab handles hazardous waste and this application helps keep track the information so they can remain compliant with those orders.

<http://epc.lanl.gov>

The screenshot shows the 'Waste Area Tracking System' web application. On the left is a navigation menu with links: Home, Sites, Waste Areas, View RCRA Unit, and Reference Documents. The main content area has a yellow header with the title 'Waste Area Tracking System'. Below the header, it says 'Welcome to the Waste Area Tracking system. This application tracks all waste Areas that include:' followed by a bulleted list: Satellite Accumulation Areas, Central Accumulation Areas, Universal Waste Areas, Used Oil Areas, Special Waste Areas, PCB areas, and Radioactive staging and storage areas. Below this list, it says 'Make a selection below to get started.' and displays six buttons in a 2x3 grid: 'Establish Site' (with subtext 'Click here to create a new site.'), 'Site Maintenance' (with subtext 'Click here to update an existing site or decommission a site.'), 'Waste Areas' (with subtext 'Click here to view all current Waste Areas.'), 'Resource Conservation and Recovery Act (RCRA)' (with subtext 'Click here to view RCRA Units.'), 'Administration' (with subtext 'Click here for Administrative options.'), and an empty button.

Waste Area Tracking System

Welcome to the Waste Area Tracking system. This application tracks all waste Areas that include:

- Satellite Accumulation Areas
- Central Accumulation Areas
- Universal Waste Areas
- Used Oil Areas
- Special Waste Areas
- PCB areas
- Radioactive staging and storage areas

Make a selection below to get started.

|                                                                                        |                                                                                          |                                                                   |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Establish Site</b><br>Click here to create a new site.                              | <b>Site Maintenance</b><br>Click here to update an existing site or decommission a site. | <b>Waste Areas</b><br>Click here to view all current Waste Areas. |
| <b>Resource Conservation and Recovery Act (RCRA)</b><br>Click here to view RCRA Units. | <b>Administration</b><br>Click here for Administrative options.                          |                                                                   |

# Waste Area Tracking System

Welcome to the Waste Area Tracking system. This application tracks all waste Areas that include:

- Satellite Accumulation Areas
- Central Accumulation Areas
- Universal Waste Areas
- Used Oil Areas
- Special Waste Areas
- PCB areas
- Radioactive staging and storage areas

Make a selection below to get started.

## Establish Site

Click here to create a new site.

## Site Maintenance

Click here to update an existing site or decommission a site.

## Waste Areas

Click here to view all current Waste Areas.

## Resource Conservation and Recovery Act (RCRA)

Click here to view RCRA Units.

## Administration

Click here for Administrative options.

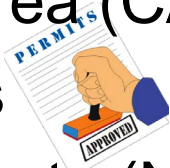
# Registering Waste Accumulation and Storage Areas

- We use the **Waste Area Tracking System** to register, update, and remove:
- SAAs, CAAs, UOAs, TSFs, UWAs, PCBs, SWAs, and rad staging and storage areas.
- Only Geri Martinez ([geri@lanl.gov](mailto:geri@lanl.gov)) is allowed to register TSFs.
  - Geri receives information from the permitted team when a TSF has to be registered or removed.
  - WMCs can update the owner info for the TSFs.



# Waste Storage and Waste Types

- Satellite Accumulation Area (SAA)
- Central Accumulation Area (CAA)
- Permitted Storage Units
- New Mexico Special Waste (NMSW)
- Polychlorinated Biphenyl (PCB)
- Universal Waste
- Used Oil
- Radioactive Waste



# Enabling Objectives

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- Identify different types of waste
- Identify different types of registered waste storage areas
- Given a type of waste or waste accumulation/storage area, identify the requirements that apply





# Module 8: Waste Treatment

Waste Management Fundamentals  
for Environmental Professionals

UTrain: 50448

Revision 0; Aug. 2021



# The Modules

- 1: ~~Intro to Waste~~ ✓
- 2: ~~Waste Regulations and Requirements~~ ✓
- 3: ~~Waste Planning~~ ✓
- 4: ~~Waste Generation and Tracking~~ ✓
- 5: ~~Waste Characterization~~ ✓
- 6: ~~Waste Packaging~~ ✓
- 7: ~~Waste Accumulation and Storage~~ ✓
- 8: **Waste Treatment**
- 9: Waste Shipping
- 10: Operating Experience and Lessons Learned

YOU  
are  
HERE



# Enabling Objectives

---

- Identify the options available for waste treatment by a waste generator
- Recognize what waste treatment options are allowed and what waste treatment options are not allowed



| TSDFs                             | EnergySolutions<br>in Clive, UT | Nevada National<br>Security Site | PermaFix DSSI in<br>Oak Ridge, TN | PermaFix in<br>Richland, WA via<br>Portage (RWLTF)<br>and Triad (MW) | PermaFix in<br>Gainesville, FL | Veolia in<br>Henderson,<br>Colorado | Stericycle in<br>Albuquerque,<br>NM | Waste Control<br>Specialists in<br>Andrews, TX |
|-----------------------------------|---------------------------------|----------------------------------|-----------------------------------|----------------------------------------------------------------------|--------------------------------|-------------------------------------|-------------------------------------|------------------------------------------------|
| Types of Waste                    |                                 |                                  |                                   |                                                                      |                                |                                     |                                     |                                                |
| LLW                               | X                               | X                                | X                                 |                                                                      | X                              |                                     |                                     | X                                              |
| LLW-RLWTF                         |                                 |                                  |                                   | X                                                                    |                                |                                     |                                     |                                                |
| LLW-Soil                          | X                               |                                  |                                   |                                                                      |                                |                                     |                                     | X                                              |
| MLLW                              | X                               |                                  | X                                 | X                                                                    | X                              |                                     |                                     | X                                              |
| Chem/Haz                          |                                 |                                  |                                   |                                                                      |                                | X                                   |                                     |                                                |
| NMSW                              |                                 |                                  |                                   |                                                                      |                                | X                                   |                                     |                                                |
| NMSW<br>SERF filter cake          |                                 |                                  |                                   |                                                                      |                                | X                                   |                                     |                                                |
| Bulk landfill items               |                                 |                                  |                                   |                                                                      |                                |                                     |                                     |                                                |
| D&D debris                        |                                 |                                  |                                   |                                                                      |                                | X                                   |                                     |                                                |
| Asphalt                           |                                 |                                  |                                   |                                                                      |                                |                                     |                                     |                                                |
| NMSW<br>Asbestos                  |                                 |                                  |                                   |                                                                      |                                | X                                   |                                     |                                                |
| Petroleum<br>Contaminated<br>Soil |                                 |                                  |                                   |                                                                      |                                | X                                   |                                     |                                                |
| PCB-Soil                          |                                 |                                  |                                   |                                                                      |                                | X                                   |                                     |                                                |
| Universal<br>Waste                |                                 |                                  |                                   |                                                                      |                                | X                                   |                                     |                                                |
| NMSW<br>Medical                   |                                 |                                  |                                   |                                                                      |                                |                                     | X                                   |                                                |

See separate writeup about  
each of these TSDFs

TSDFs that LANL utilizes for  
various types of waste –  
dependent on the waste type  
and the capabilities of the TSDF

Updated 6-16-2021

LA

[https://www.youtube.com/watch?v=D8jfLf\\_bODs](https://www.youtube.com/watch?v=D8jfLf_bODs)

## What Veolia does



0:03 / 3:38

Treatment and recovery of hazardous waste | Veolia

# Treatment

- Treatment is any method, technique, or process, including, neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amendable for storage, or reduced in volume.
- The Environmental Protection Agency (EPA) has consistently interpreted its regulations **to allow generators to treat hazardous waste in their accumulation tanks and containers, without obtaining a permit or having interim status.** Examples of treatment that may be conducted in accumulation tanks and containers include neutralization, precipitation of heavy metals from solutions, and oxidation/reduction reactions.



# Our Treatment Procedure

- FSD-P409-0800; ***Waste Treatment Decision Making***
- As shown in the Revision History, this procedure replaces many former procedures (“tools”)

## 1.1 Purpose

The purpose of this document is to provide requirements for waste treatment throughout LANL and support effective decision making. This procedure provides guidance and a brief description of the options available to generators and managers of hazardous waste that are considering alternatives for treatment. In addition, this document summarizes key requirements and considerations as part of the treatment decision-making process at LANL.

# Our Treatment Procedure

- FSD-P409-0800; **Waste Treatment Decision Making**
- As shown in the Revision History, this procedure replaces many former procedures (“tools”)

|                                                                                                     |                              |                                                                                   |
|-----------------------------------------------------------------------------------------------------|------------------------------|-----------------------------------------------------------------------------------|
| FSD-P409-0800                                                                                       | Revision: 0                  |  |
| Effective Date: 05/18/2021                                                                          | Next Review Date: 05/18/2024 |                                                                                   |
| <b>Environment, Safety, Health, Quality, Safeguards, Security Directorate</b>                       |                              |                                                                                   |
| <b>Environmental Protection and Compliance Programs</b>                                             |                              |                                                                                   |
| <b>Functional Series Document</b>                                                                   |                              |                                                                                   |
| <br><b>Waste Treatment Decision Making</b>                                                          |                              |                                                                                   |
| Document Owner/Subject Matter Expert:                                                               |                              |                                                                                   |
| Name:<br>Oral Saulters                                                                              | Organization:<br>EPC-WMP     | Signature:<br>Signature on File                                                   |
|                                                                                                     |                              | Date:<br>05-12-21                                                                 |
| Derivative Classifier: <input checked="" type="checkbox"/> Unclassified or <input type="checkbox"/> |                              |                                                                                   |

## REVISION HISTORY

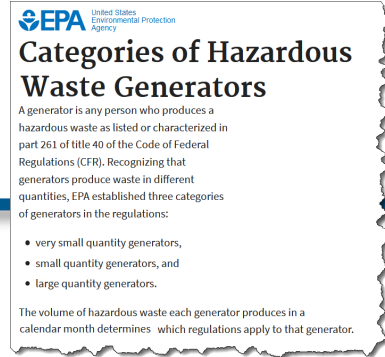
### Description of Changes

The following documents are being replaced by this procedure. <sup>1</sup> ADESH-AP-TOOL-810 Waste Processing at LANL Hazard Waste Permitted Units, <sup>2</sup> ADESH-AP-TOOL-901 Elementary Neutralization, <sup>3</sup> ADESH-AP-TOOL-902 Sorption Without a Permit, <sup>4</sup> ADESH-AP-TOOL-906 Treatment by the Waste Generator, <sup>5</sup> ADESH-IG-TOOL-903 TA-55 Storage in Tanks and Treatments by Stabilization, <sup>6</sup> ADESH-IG-TOOL-904 Treatment by Open Burning, <sup>7</sup> ADESH-IG-TOOL-905 Treatment by Open Detonation, <sup>8</sup> ADESH-IG-TOOL-907 Stabilization in Containers.



# Treatment

- The provisions of 40 CFR 262.17 for large generators require that generators comply with most of the technical standards for containers (40 CFR §265 Subpart I) and tanks (40 CFR §265 Subpart J) with which an interim status storage facility would have to comply. Generators are to comply with all of the provisions for treatment, storage and disposal facilities except the financial responsibility, closure/post-closure and corrective action regulations.
- Treatment by the Waste Generator can be conducted in a Central Accumulation Area provided they are compliant with all applicable provisions in 40 CFR 262.17. The following conditions must be met before treatment can occur:





# Treatment

- Treatment must be conducted in tank or container.
- Treatment must take place in a Central Accumulation Area and must be in compliance with 40 CFR 265, Subparts, I, J, W and/or DD.
- Complete and submit a Waste Generator Treatment Plan (WGTP) to Geri Martinez, [geri@lanl.gov](mailto:geri@lanl.gov) before any hazardous waste is treated. **The WGTP must be approved by EPC-WMP before treatment can occur.** The WGTP must be submitted annually to EPC-WMP for approval.
- A Waste Analysis Plan (WAP) must be completed and implemented when treating to meet Land Disposal Restrictions (LDR) treatment standards. The WAP must include detailed chemical and physical analysis of a representative sample of the prohibited waste(s) being treated and contain all the information required to treat the waste(s).



# Treatment

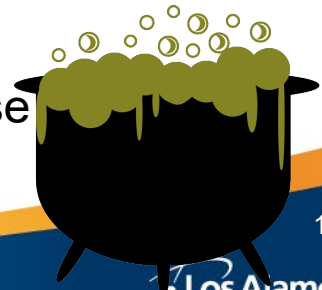
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- Call 7-6259 to determine if a waste analysis plan (WAP) must be submitted. EPC-WMP can also provide you with a sample WAP.
- Ensure the waste to be treated is compatible with the container/tank.
- **NOTE:** Thermal treatment cannot be conducted by a waste generator; a permit is required for that type of treatment.



# Elementary Neutralization Unit Exemption (ENU)

- The ENU exemption allows generators and TSDFs to neutralize certain hazardous and mixed wastes without a permit provided certain criteria are met.
- To be exempt, the generator or TSDF operator may only neutralize hazardous/mixed waste that is corrosive ONLY (D002) (i.e., it has no other EPA Hazardous Waste Numbers), and may only conduct neutralization in a unit that meets the RCRA definition of a tank, tank system, container, transport vehicle, or vessel (does not need to be conducted in a CAA).
  - Any questions regarding implementation or interpretation of these requirements should be addressed to **EPC-WMP at 7-6259**.



# Sorption

- The LANL Permit and RCRA regulations prohibit “treatment” without a permit, unless specific exemptions are met. The United States Environmental Protection Agency provided a sorbent material exemption, which allows generators and TSDF operators to place sorbents (e.g., zeolite kitty litter) in a container without a permit provided certain criteria are met. Any questions regarding implementation or interpretation of these requirements should be addressed by EPC-WMP at 7-6259.
- The addition of sorbent material to hazardous/mixed waste in a container (or adding hazardous/mixed waste to sorbent material) is considered to be “treatment,” which requires a RCRA permit unless the addition of sorbent qualifies for the exemption under 40 CFR §264.1(g)(10) and §270.1 (c)(2)(vii).



# Sorption (continued)



- The following requirements must be met to be exempt:
  - The sorbent must be added to waste in a container (or waste is added to the sorbent) at the time waste is first placed in the container,
  - The addition of sorbent cannot create an ignitable, reactive, or incompatible waste, and
  - The sorbent must be compatible with the type of waste and container; cannot result in reactions that damage the structural integrity of the container or facility.
  - To be compliant with these requirements, LANL has established a procedure to (1) make a “compatibility determination” conducted by designated subject matter experts (SMEs) to ensure that the sorbent material can be safely mixed with the waste, including secondary materials, and will not result in potential reactions or damage to the container, including the inner liner; and (2) ensure that the addition of absorbents is *well-documented for safe and compliant processing*.

# Treatment At TSFs



- Treatment at a TSF must not be conducted prior to contacting the Permitting Team within Environmental Protection and Compliance-Waste Management Program (EPC-WMP), and procedures have been reviewed for compliance with the LANL Hazardous Waste Facility Permit.
- An example of treatment at a TSF is Macroencapsulation, an EPA-approved immobilization technology that includes the application of surface coating materials such as polymeric organics (e.g., resins and plastics) or use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media.
  - Permit Part 8, *Treatment by Macroencapsulation* includes the permit conditions associated with the treatment of hazardous waste debris and radioactive lead solids by macroencapsulation.

# Treatment

The Permittees may conduct this treatment at the following hazardous waste management units:

- TA-3-29, up to 3,441 gallons/day
- TA-50-69 Outdoor Pad, up to 275 gallons/day
- TA-54 Area G Pad 1, up to 23,160 gallons/day
- TA-54 Area G Pad 3, up to 23,160 gallons/day
- TA-54 Area G Pad 5, up to 23,160 gallons/day
- TA-54 Area G Pad 6, up to 23,160 gallons/day
- TA-54 Area G Pad 9, up to 23,160 gallons/day
- TA-54 Area G Pad 10, up to 23,160 gallons/day
- TA-54 Area G Pad 11, up to 23,160 gallons/day
- TA-54 Area G TA-54-33, up to 23,160 gallons/day
- TA-54 Area L Outdoor Pad, up to 23,160 gallons/day
- TA-54-38 West Outdoor Pad, up to 3,441 gallons/day
- TA-55-4, B40, up to 3,441 gallons/day
- TA-55-4, B45, up to 3,441 gallons/day
- TA-55-4 Outdoor Storage Pad, up to 3,441 gallons/day
- TA-55-355 Pad, up to 3,441 gallons/day
- TA-63 Transuranic Waste Facility, up to 23,160 gallons/day





# Module 8: Enabling Objectives

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- Identify the options available for waste treatment by a waste generator
- Recognize what waste treatment options are allowed and what waste treatment options are not allowed





# Module 9: Waste Shipping / Disposition

Waste Management Fundamentals  
for Environmental Professionals

UTrain: 50448

Revision 0; Aug. 2021



# The Modules

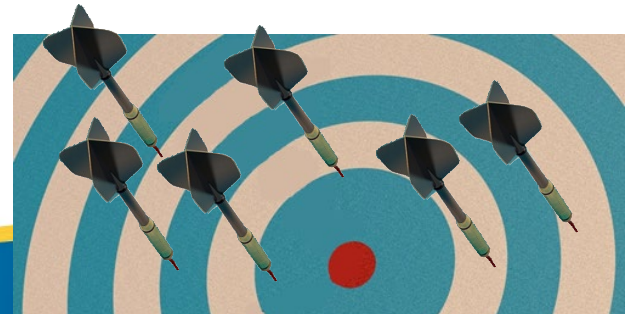
- 1: ~~Intro to Waste~~ ✓
- 2: ~~Waste Regulations and Requirements~~ ✓
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- 8: ~~Waste Treatment~~ ✓
- 9: **Waste Shipping**
- 10: Operating Experience and Lessons Learned

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# Module 9: Enabling Objectives

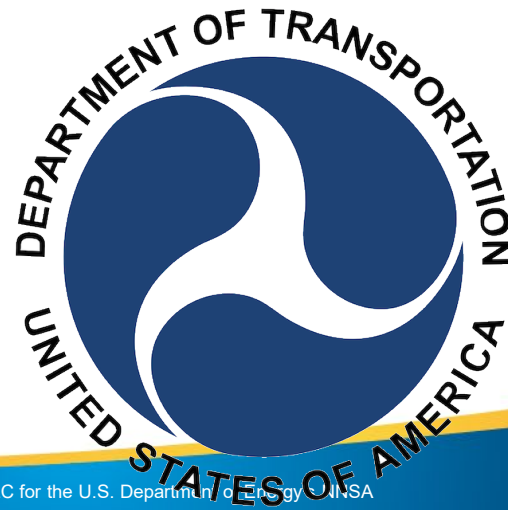
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- Recognize DOT authority when shipping waste.
- Identify attributes of shipping waste on-site at LANL.
- Recognize requirements for shipping waste off-site.
- Identify the responsibilities of personnel involved in shipping waste.



# Shipping Hazardous Waste

- The **US EPA** regulates hazardous wastes at LANL under RCRA. However, (for the most part) there are no RCRA regulations for wastes that are out on the road.
- The **US DOT** is the agency that regulates transportation of freight, including the transport of hazardous waste.



# Shipping Hazardous ~~Waste~~ Materials

- The **US DOT** is the agency that regulates transportation of freight, including the transport of hazardous waste.

The DOT uses the EPA definition of hazardous waste. However, DOT regulates hazardous materials which is much broader and includes hazardous AND radioactive waste.

Example: An EPA Hazardous Waste Manifest is not required for LLW but DOT regulates LLW as a hazardous materials shipment and requires a separate manifest.

*DOT includes radionuclides; RCRA does not*



# DOT Hazardous Materials Table

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- 49 CFR § 172.101

**(a) The Hazardous Materials Table (Table) in this section designates the materials listed therein as hazardous materials for the purpose of transportation of those materials.**

For each listed material, the Table identifies the hazard class or specifies that the material is forbidden in transportation, and gives the proper shipping name or directs the user to the preferred proper shipping name. In addition, the Table specifies or references requirements in this subchapter pertaining to labeling, packaging, quantity limits aboard aircraft and stowage of hazardous materials aboard vessels.



# DOT Hazardous Materials Table

§172.101 Hazardous Materials Table

| Symbols | Hazardous materials descriptions and proper shipping names                                                                                                               | Hazard class or Division | Identification Numbers | PG  | Label Codes | Special provisions (§172.102) | (8)                      |          |      | (9)                                            |                     | (10)           |       |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------|-----|-------------|-------------------------------|--------------------------|----------|------|------------------------------------------------|---------------------|----------------|-------|
|         |                                                                                                                                                                          |                          |                        |     |             |                               | Packaging (§173.***)     |          |      | Quantity limitations (see §§173.27 and 175.75) |                     | Vessel stowage |       |
|         |                                                                                                                                                                          |                          |                        |     |             |                               | Exceptions               | Non-bulk | Bulk | Passenger aircraft/rail                        | Cargo aircraft only | Location       | Other |
| (1)     | (2)                                                                                                                                                                      | (3)                      | (4)                    | (5) | (6)         | (7)                           | (8A)                     | (8B)     | (8C) | (9A)                                           | (9B)                | (10A)          | (10B) |
|         | <i>Accellerene, see p-Nitrosodimethylaniline</i>                                                                                                                         |                          |                        |     |             |                               |                          |          |      |                                                |                     |                |       |
|         | <i>Accumulators, electric, see Batteries, wet etc</i>                                                                                                                    |                          |                        |     |             |                               |                          |          |      |                                                |                     |                |       |
|         | <i>Accumulators, pressurized, pneumatic or hydraulic (containing non-flammable gas), see Articles pressurized, pneumatic or hydraulic (containing non-flammable gas)</i> |                          |                        |     |             |                               |                          |          |      |                                                |                     |                |       |
|         | Acetal                                                                                                                                                                   | 3                        | UN1088                 |     | II          | 3                             | IB2, T4, TP1             | 150      | 202  | 242                                            | 5 L                 | 60 LE          |       |
|         | Acetaldehyde                                                                                                                                                             | 3                        | UN1089                 |     | I           | 3                             | A3, B16, T11, TP2, TP7   | None     | 201  | 243                                            | Forbidden           | 30 LE          |       |
| A       | Acetaldehyde ammonia                                                                                                                                                     | 9                        | UN1841                 |     | III         | 9                             | IB8, IP3, IP7, T1, TP33  | 155      | 204  | 240                                            | 200 kg              | 200 kg A       | 3     |
|         | Acetaldehyde oxime                                                                                                                                                       | 3                        | UN2332                 |     | III         | 3                             | B1, IB3, T4, TP1         | 150      | 203  | 242                                            | 60 L                | 220 LA         |       |
|         | Acetic acid, glacial or Acetic acid solution, with more than 80 percent acid in mass                                                                                     | 8                        | UN2789                 |     | II          | 8, 3                          | A3, A6, A7, A10, B2, TP2 | 154      | 202  | 243                                            | 1 L                 | 30 LA          |       |

# On-site Shipping

- Moving DOT-compliant containers from TAs across LANL to TA-60, Bldg. 17.
  - We use TA-60-17 as our **temporary waste storage area**.
    - It's not permitted so we can store RCRA waste for **only 90 days** (i.e., a **Central Accumulation Area (CAA)**).
  - Primarily used to collect small amounts of waste until we have enough to make efficient shipments.

Although TA-60-17 is our primary focus, other types of intra-site transfers do occur.



|                                                                                                                                                                                            |                              |                                   |                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------------------|-------------------|
| TP-P409-0700                                                                                                                                                                               | Revision: 0                  | Los Alamos<br>NATIONAL LABORATORY |                   |
| Effective Date: 04/16/2021                                                                                                                                                                 | Next Review Date: 04/16/2024 |                                   |                   |
| Environment, Safety, Health, Quality, Safeguards, and Security Directorate                                                                                                                 |                              |                                   |                   |
| Waste Management Division                                                                                                                                                                  |                              |                                   |                   |
| Technical Procedure                                                                                                                                                                        |                              |                                   |                   |
| On-Site Waste Management Field Tasks                                                                                                                                                       |                              |                                   |                   |
| Document Owner/Subject Matter Expert:                                                                                                                                                      |                              |                                   |                   |
| Name:<br>Patrick Kennedy                                                                                                                                                                   | Organization:<br>WM-WMS      | Signature:<br>Signature on File   | Date:<br>04-08-21 |
| Derivative Classifier: <input checked="" type="checkbox"/> Unclassified or <input type="checkbox"/>                                                                                        |                              |                                   |                   |
| Name:<br>Steve Shelton                                                                                                                                                                     | Organization:<br>WM-WGS      | Signature:<br>Signature on File   | Date:<br>04-15-21 |
| Approval Signatures:                                                                                                                                                                       |                              |                                   |                   |
| Quality Assurance Reviewer:<br>Larry Maassen                                                                                                                                               | Organization:<br>IQPA-ASO    | Signature:<br>Signature on File   | Date:<br>04-16-21 |
| Responsible Line Manager:<br>Patrick Kennedy, Team Leader                                                                                                                                  | Organization:<br>WM-WMS      | Signature:<br>Signature on File   | Date:<br>04-16-21 |
| Responsible Line Manager:<br>Steve Singledecker, Group Leader                                                                                                                              | Organization:<br>WM-WMS      | Signature:<br>Signature on File   | Date:<br>04-16-21 |
| This copy is uncontrolled.<br>Users are responsible for ensuring they work to the latest approved version.<br>To document a required read, login to UTrain, and go to the Advanced Search. |                              |                                   |                   |

# Off-site Shipping



- Moving DOT-compliant containers from TAs across LANL to off-site facilities
  - Must meet their Waste Acceptance Criteria (WAC)
  - Comply with DOT requirements
  - Comply with NRC requirements
  - Comply with receiving State requirements
- All shipments are preapproved by TSDF facilities and Chem/Haz facilities before shipments leave the laboratory.
- Off-site Waste Profile and contracts are in place prior to shipping

*We don't dispose of any of our waste onsite so it's going to end up offsite.*

|                                                                                                                                                                                                             |                              |                                 |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------------|-------------------|
| TP-P409-0701                                                                                                                                                                                                | Revision: 1                  |                                 |                   |
| Effective Date: 04/28/2021                                                                                                                                                                                  | Next Review Date: 04/28/2024 |                                 |                   |
| Environment, Safety, Health, Quality, Safeguards, and Security Directorate<br>Waste Management Division<br>Technical Procedure                                                                              |                              |                                 |                   |
| <b>Preparing and Shipping Waste/Material Off-Site</b>                                                                                                                                                       |                              |                                 |                   |
| Document Owner/Subject Matter Expert                                                                                                                                                                        |                              |                                 |                   |
| Name:<br>Patrick Kennedy                                                                                                                                                                                    | Organization:<br>WM-WMS      | Signature:<br>Signature on File | Date:<br>04-08-21 |
| Derivative Classifier: <input checked="" type="checkbox"/> Unclassified or <input type="checkbox"/>                                                                                                         |                              |                                 |                   |
| Name:<br>Steve Shelton                                                                                                                                                                                      | Organization:<br>WM-WGS      | Signature:<br>Signature on File | Date:<br>04-08-21 |
| Approval Signatures:                                                                                                                                                                                        |                              |                                 |                   |
| Quality Assurance Reviewer:<br>Larry Maassen                                                                                                                                                                | Organization:<br>HQPA-QSS    | Signature:<br>Signature on File | Date:<br>04-12-21 |
| Responsible Line Manager:<br>Steven Singledecker, Group Leader                                                                                                                                              | Organization:<br>WM-WMS      | Signature:<br>Signature on File | Date:<br>04-28-21 |
| This copy is uncontrolled.<br>Users are responsible for ensuring they work to the latest approved version.<br>To document a required read, Login to <a href="#">UTrain</a> , and go to the Advanced Search. |                              |                                 |                   |

# Personnel Involved

- Technical Personnel
- Authorized Shipper (Waste)
- LAB Pack
- HAZMAT Driver
- Forklift operator

- Perform packaging, marking, labeling, and supporting documentation in support of the transportation of hazardous waste/materials

- SME for transportation of hazardous material/waste
- Perform final review of most shipping documents
- Assign a Hazardous Waste Review (HWR number)

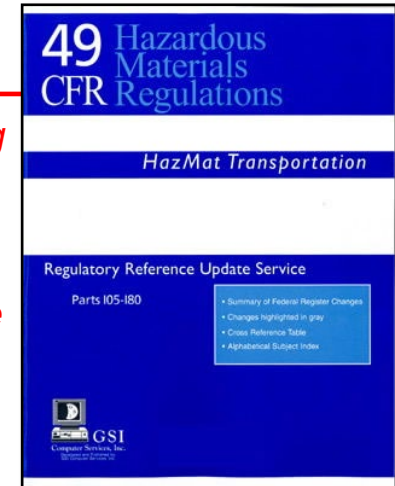
- DOT-compliant shipping of lab packs

- Drivers who transport hazardous materials

- Operates a forklift

*The DOT has specific training and other requirements for personnel involved in packaging, shipping, and transporting hazardous waste and materials*

- Topics to be trained on
- Time limits for qualification
- Testing requirements
- CDL with endorsements



# Paperwork (Documentation)

- Philosophy

*"If it's not documented,  
it didn't really happen"*



- Different documents are required depending on waste type and where the waste is heading

TABLE 1. VARIOUS WASTE TYPE **ONSITE SHIPPING PAPER REQUIREMENTS**

| Package Type               | LDR | Uniform Hazardous Waste Manifest | Non-Regulated Waste Manifest | Waste Data Forms |
|----------------------------|-----|----------------------------------|------------------------------|------------------|
| RCRA                       | X   | X                                |                              | X                |
| PCB                        |     | X                                |                              | X                |
| Asbestos                   |     |                                  | X                            | X                |
| Universal                  |     |                                  | X                            | X                |
| DOT, Non-Rad, Non-RCRA     |     |                                  | X                            | X                |
| Non-DOT, Non-RCRA, Non-Rad |     |                                  | X                            | X                |
| MLLW                       | X   | X                                |                              | X                |
| LLW                        |     |                                  | X                            | X                |

These come from WCATS



# Paperwork (Documentation)

Form Approved: OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's Name and Mailing Address  
2. Page 1 of 3  
3. Emergency Response Phone  
4. Manifest Tracking Number

5. Generator's Site Address (if different than mailing address)  
6. Generator's Phone  
7. Transporter 1 Company Name  
8. Designated Facility Name and Site Address  
9. Facility's Phone  
10. Containers  
11. Total Quantity  
12. Unit  
13. Waste Codes  
14. Special Handling Instructions and Additional Information  
15. GENERATOR/SOFTWARE CERTIFICATION: I hereby declare that the contents of this manifest are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled in accordance with applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this manifest conform to the requirements of the applicable Export Administration Regulations of the U.S. Department of Commerce. I certify that the waste manifestization statement identified in 40 CFR 263.23 (c) (1) is a large quantity generator or (c) (2) (i) is a small quantity generator is true.

16. International Shipments  
17. Transporter Acknowledgment of Receipt of Materials  
18. Disposal  
19. Designated Facility  
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in item 18a.

NON-HAZARDOUS WASTE MANIFEST

1. Generator's Name and Mailing Address  
2. Page 1 of 3  
3. Emergency Response Phone  
4. Manifest Tracking Number

5. Generator's Site Address (if different than mailing address)  
6. Generator's Phone  
7. Transporter 1 Company Name  
8. Designated Facility Name and Site Address  
9. Facility's Phone  
10. Containers  
11. Total Quantity  
12. Unit  
13. Waste Codes  
14. Special Handling Instructions and Additional Information  
15. GENERATOR/SOFTWARE CERTIFICATION: I hereby declare that the contents of this manifest are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled in accordance with applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this manifest conform to the requirements of the applicable Export Administration Regulations of the U.S. Department of Commerce. I certify that the waste manifestization statement identified in 40 CFR 263.23 (c) (1) is a large quantity generator or (c) (2) (i) is a small quantity generator is true.

16. International Shipments  
17. Transporter Acknowledgment of Receipt of Materials  
18. Disposal  
19. Designated Facility  
20. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in item 17a.



WASTE DATA FORM  
W862353



| Rad Summary              |             |                      |                |
|--------------------------|-------------|----------------------|----------------|
| Total Activity (nCi/g):  | 4.04014E-02 | Decay Heat [W] (U):  | 2.06096E-06    |
| Alpha (nCi/g):           | 4.04014E-02 | DOT Fissile Mat (g): | 2.80292E-01    |
| TRU Alpha (nCi/g):       | 0.00000E+00 | Transport Index:     | 0.1            |
| **MDA TRU Alpha (nCi/g): | 0.00000E+00 | NRC Class:           | A              |
| Pu-239 FGE:              | 1.80228E-01 | DOT Type:            | A              |
| Pu-239 FGE [2U]:         | 5.40693E-01 | LSA-I Fraction:      | 4.98283E-03 Y  |
| Pu-239 Eq-Ci:            | 1.10661E-05 | LSA-II Fraction:     | 7.32674E-07 Y  |
| Pu-239 Eq-Ci [2U]:       | 2.62182E-05 | LSA-III Fraction:    | 3.66337E-08 Y  |
| TRU Pu-239 Eq-Ci:        | 0.00000E+00 | Reportable Quantity: | 4.59060E-04 N  |
| TRU Pu-239 Eq-Ci [2U]:   | 0.00000E+00 | *ALC Ratio:          | 1.69852E+02 NE |
| Tritium (Ci/m3):         | 0.00000E+00 | *ACM Ratio:          | 1.49485E-01 E  |
| ECW PE-Ci:               | 1.10661E-05 | Limited Quantity:    | 8.32500E-02 Y  |

#### Weight/Volume Used:

- 1 Container Net Weight: 1.13625E+03 kg  
2 Container Waste Volume: 2.54852E+00 m<sup>3</sup>

\*ALC (Activity Limit for Exempt Consignment)  
\*ACM (Activity Concentration for Exempt Material)  
\*\* Use for LSA/TRU Destruction



WASTE DATA FORM  
W862353



Current Location

| Company | Facility | Unit   | Grid X | Grid Y | Grid Z | Grid P |
|---------|----------|--------|--------|--------|--------|--------|
| LANL    | 03       | 000006 |        |        |        |        |

CON-LW, NO VERIFICATION REQUIRED

Labeled ID: W862353  
W8 ID: 48945

Waste Type: SIGMA LOW-LEVEL WASTE CLEANUP  
Waste Type: Low Level Waste  
Container Type: CM-B-25 steel box

Gross Weight: 3250.0 lb  
Tare Weight: 745.0 lb  
Net Weight: 2505.0 lb

Accum Start Date:  
STP Code:  
Physical State: SOLID  
ERG #:  
Generator: RANDY MARTINEZ (112748), 5056654563  
WMC: RANDY MARTINEZ (112748), 5056654563

Container Volume: 90.0 CF  
STP Version:  
STP Vol (m3):

Shipping Description: NON-REGULATED, SOLID

# Preparing and Shipping Waste/Material Off-Site

No: TP-P409-0701

Page 14 of 30

Revision: 1

Effective Date: 04/28/2021

## Appendix 1: Required Shipping Documents

These documents are sent with the driver and become part of the permanent record.

| Package Type           | LDR | Uniform<br>Hazardous<br>Waste<br>Manifest | DOT Shipping<br>Papers | NMSW<br>Manifest | PCB<br>Continuation<br>Sheet | NRC<br>540/541<br>Manifest | Exclusive Use<br>Instructions<br>(as<br>applicable) | Highway 30<br>Travel<br>Prohibition (as<br>applicable) | NNSS<br>Driver's<br>Packet | State of<br>Washington<br>Driver Forms<br>(as applicable) |
|------------------------|-----|-------------------------------------------|------------------------|------------------|------------------------------|----------------------------|-----------------------------------------------------|--------------------------------------------------------|----------------------------|-----------------------------------------------------------|
| RCRA                   | X   | X                                         |                        |                  |                              |                            |                                                     |                                                        |                            |                                                           |
| PCB                    |     | X                                         |                        |                  | X                            |                            |                                                     |                                                        |                            |                                                           |
| Asbestos               |     |                                           | X**                    |                  |                              |                            |                                                     |                                                        |                            |                                                           |
| Universal              |     |                                           | X                      |                  |                              |                            |                                                     |                                                        |                            |                                                           |
| DOT Regulated          |     |                                           | X                      |                  |                              |                            |                                                     |                                                        |                            |                                                           |
| Non-Regulated Material |     |                                           | X                      |                  |                              |                            |                                                     |                                                        |                            |                                                           |
| MLLW                   | X   | X                                         |                        |                  |                              | X*                         | X                                                   | X                                                      |                            | X                                                         |
| LLW                    |     |                                           | X*                     |                  |                              | X*                         | X                                                   | X                                                      |                            | X                                                         |
| LLW/PCB                |     | X                                         |                        |                  | X                            | X                          | X                                                   | X                                                      |                            |                                                           |
| NMSW                   |     |                                           | X**                    | X                |                              |                            |                                                     |                                                        |                            |                                                           |
| Shipments to NNSS      |     |                                           | X                      |                  |                              |                            | X                                                   | X                                                      | X                          |                                                           |

\* As applicable, not required for NNSS

\*\* If manifest is not provided by disposal TSDF.



APPROVED BY OMB: NO. 3150-0166  
EXPIRES: 01/31/2023

Estimated burden per response to comply with this information collection request: 3.3 hours. This uniform manifest is required by NRC to meet reporting requirements of Federal and State Agencies for the safe transportation and disposal of low-level waste estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollections.Resource@nrc.gov](mailto:Infocollections.Resource@nrc.gov), and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0166), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: [nrc\\_submission@omb.eop.gov](mailto:nrc_submission@omb.eop.gov). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document displays a currently valid OMB control number.

NRC FORM 541

(06-2021)

U.S. NUCLEAR REGULATORY COMMISSION  
**UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST  
CONTAINER AND WASTE DESCRIPTION**

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

See NUREG/BR-0204 for detailed instructions for completing this form:  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0204/>

| 1. Manifest Totals                                                 |                                             |                                |                                             |                            |                                                                                                              |                                                                                          |             |                                           |  |                                                       | 2. Manifest Number                                                     |                                                                   |                                          |                                                                                                                                                                 |                                                                                       |
|--------------------------------------------------------------------|---------------------------------------------|--------------------------------|---------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------|-------------------------------------------|--|-------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| No. of Pkgs/<br>Disposal<br>Containers                             | Net Waste<br>Volume<br>(m <sup>3</sup> )    | Net Waste<br>Weight<br>(kg)    | Special Nuclear Material (grams)            |                            |                                                                                                              |                                                                                          | Source (kg) |                                           |  |                                                       |                                                                        |                                                                   |                                          |                                                                                                                                                                 |                                                                                       |
|                                                                    |                                             |                                | U-233                                       | U-235                      | Pu                                                                                                           | Total                                                                                    |             |                                           |  |                                                       |                                                                        |                                                                   |                                          |                                                                                                                                                                 |                                                                                       |
| Activity (MBq)                                                     |                                             |                                | All Nuclides                                | Tritium                    | C-14                                                                                                         | Tc-99                                                                                    | I-129       | 3. Page <u>1</u> of <u>      </u> Page(s) |  |                                                       |                                                                        |                                                                   |                                          |                                                                                                                                                                 |                                                                                       |
| Activity (MBq)                                                     |                                             |                                |                                             |                            |                                                                                                              |                                                                                          |             | 4. Shipper Name                           |  |                                                       |                                                                        |                                                                   |                                          |                                                                                                                                                                 |                                                                                       |
| Activity (MBq)                                                     |                                             |                                | Activity (MBq)                              |                            |                                                                                                              | Shipper ID Number                                                                        |             |                                           |  |                                                       |                                                                        |                                                                   |                                          |                                                                                                                                                                 |                                                                                       |
| Disposal Container Description                                     |                                             |                                |                                             |                            |                                                                                                              |                                                                                          |             |                                           |  |                                                       | Waste Description for Each Waste Type in Container                     |                                                                   |                                          |                                                                                                                                                                 |                                                                                       |
| 5. Container<br>Identification<br>Number/Generator<br>ID Number(s) | 6. Container<br>Description<br>(See Note 1) | 7. Volume<br>(m <sup>3</sup> ) | 8. Waste<br>and<br>Container<br>Weight (kg) | 9. Waste<br>Weight<br>(kg) | 10. Surface<br>Radiation Level<br><br><input type="checkbox"/> (μSv/hr)<br><input type="checkbox"/> (mSv/hr) | 11. Surface<br>Contamination<br>MBq/100 cm <sup>2</sup><br><br>Alpha      Beta-<br>Gamma |             | 12. Waste<br>Descriptor<br>(See Note 2)   |  | 13. Approximate<br>Waste<br>Volume(s) in<br>Container | 14. Sorbent<br>Solidification,<br>Stabilization,<br>Media (See Note 3) | 15. Chemical Description<br><br>Chemical Form/<br>Chelating Agent | Weight<br>% Chelating<br>Agent if > 0.1% | 16. Radiological Description<br><br>Individual Radionuclides and Activity<br>(MBq) and Container Total, or Container<br>Total Activity and Radionuclide Percent | 17. Waste Class<br>AS-Class A Stable<br>AU-Class A Unstable<br>B-Class B<br>C-Class C |
|                                                                    |                                             |                                |                                             |                            |                                                                                                              |                                                                                          |             |                                           |  |                                                       |                                                                        |                                                                   |                                          |                                                                                                                                                                 |                                                                                       |

APPROVED BY OMB: NO. 3150-0166  
EXPIRES: 01/31/2023

Estimated burden per response to comply with this information collection request: 45 minutes. This uniform manifest is required by NRC to meet reporting requirements of Federal and State Agencies for the safe transportation and disposal of low-level waste. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollections.Resource@nrc.gov](mailto:Infocollections.Resource@nrc.gov), and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0166), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: [nrc\\_submission@omb.eop.gov](mailto:nrc_submission@omb.eop.gov). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

| NRC FORM 540                                      |  | U.S. NUCLEAR REGULATORY COMMISSION                                     |  | 5. Shipper - Name and Facility          |  | Shipper ID Number                                                                                                          |  | 7. NRC Form 540 and 540A Page 1 of <u>      </u> Page(s) <sup>Electronic</sup>                                                  |  | 8. Manifest Number                       |  |
|---------------------------------------------------|--|------------------------------------------------------------------------|--|-----------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------|--|
|                                                   |  | <b>UNIFORM LOW-LEVEL RADIOACTIVE<br/>WASTE MANIFEST SHIPPING PAPER</b> |  | User Permit Number      Shipment Number |  | <input type="checkbox"/> Collector <input type="checkbox"/> Processor<br><input type="checkbox"/> Generator Type (Specify) |  | NRC Form 541 and 541A <u>      </u> Page(s) <input type="checkbox"/>                                                            |  | Contact                                  |  |
|                                                   |  |                                                                        |  |                                         |  |                                                                                                                            |  | NRC Form 542 and 542A <u>      </u> Page(s) <input type="checkbox"/>                                                            |  |                                          |  |
| 1. Emergency Telephone Number (Include area code) |  |                                                                        |  | Contact                                 |  | Phone No (Include Area Code)                                                                                               |  | Additional Information <u>      </u> Page(s) <input type="checkbox"/>                                                           |  | 9. Consignee - Name and Facility Address |  |
| Organization                                      |  |                                                                        |  | 6. Carrier - Name and Address           |  | EPA I.D. Number                                                                                                            |  | Signature - Authorized consignee acknowledging waste receipt                                                                    |  | Date                                     |  |
| 2. Is this an "Exclusive Use" Shipment?           |  | 3. Total Number of packages identified on this manifest?               |  |                                         |  | Shipping Date                                                                                                              |  | 10. CERTIFICATION                                                                                                               |  |                                          |  |
|                                                   |  |                                                                        |  |                                         |  |                                                                                                                            |  | This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in |  |                                          |  |

# Off-Site Shipping

Exclusive Use  
Instructions  
(as  
applicable)

## NNSS CARRIER'S DRIVER PACKET

There are 4  
"exhibits" to  
this packet

### Exhibit 1:

☐ **Exclusive Use** (App. 3)

☐ **Dedicated Service Instructions** (App.5)  
(Check as applicable.)

### NOTES:

(1) **Exclusive Use** means sole use by a single consignor of a conveyance for which all initial, intermediate, and final loading and unloading are carried out in accordance with the direction of the consignor or consignee. Note this applies to radiological (Class 7) shipments only.

(2) **Dedicated Service** applies to HAZMAT cargo tanks that are "designated" for specific use such as acids only to prevent commingling of incompatible chemicals. LANL may not ever use this category.

3. The carrier is to move this shipment without delay, but in accordance with the legal statutes of transit

Routing to the Nevada National Security Site is required to avoid specific areas and features as

# Off-Site Shipping

Highway 30  
Travel  
Prohibition (as  
applicable)

## HIGHWAY 30 TRAVEL PROHIBITION

### Driver Instructions:

If Transporting Radioactive Waste From LANL,  
Do Not Travel on New Mexico State Road 30  
through the Santa Clara Pueblo.

**NOTE:** For shipments to the NNSS that do not meet the definition of "Exclusive Use" per 49 CFR must be shipped as "Dedicated Use".

The words "**Exclusive Use**" or "**Dedicated Use**" must be on the shipping paper as appropriate.

## NNSS CARRIER'S DRIVER PACKET

There are 4  
"exhibits" to  
this packet

### Exhibit 1:

☐ **Exclusive Use** (App. 3)

☐ **Dedicated Service Instructions** (App.5)

(Check as applicable.)

### NOTES:

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(2) **Dedicated Service** applies to HAZMAT cargo tanks that are "designated" for specific use such as acids only to prevent commingling of incompatible chemicals. LANL may not ever use this category.

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Routing to the Nevada National Security Site is required to avoid specific areas and features as

of  
ton  
terms  
licable)



# For Off-Site Shipping

## Preparing and Shipping Waste/Material Off-Site

No: TP-P409-0701

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Revision: 1

Effective Date: 04/28/2021

Transport Index (TI) is derived from the maximum dose equivalent rate at one meter from the surface of a package containing radioactive material

- Rad Level and TI Limits for Transportation by Road

### Appendix 2 Radiation Level and TI Limits for Transportation by Road

| Radiation Level and TI Limits for Transportation by Road |                      |                                                                                          |
|----------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------|
| Type of Transport:                                       | Non-Exclusive Use    | Exclusive Use                                                                            |
| Radiation Level Limits                                   |                      |                                                                                          |
| Package Surface:                                         | 2 mSv/h (200 mrem/h) | 2 mSv/h (200 mrem/h) Other than closed vehicles<br>10 mSv/h (1000 mrem/h) Closed Vehicle |
| Conveyance:                                              | N/A                  | 2 mSv/h (200 mrem/h): Outer Surfaces (Sides, Top and Undersides) of Vehicle              |
| Occupied Position:                                       | N/A                  | 0.02 mSv/h (2 mrem/h: at any normally occupied area                                      |
| Transportation Index (TI) Limits                         |                      |                                                                                          |
| Package:                                                 | 10 Road and Rail     | No Limit                                                                                 |
| Conveyance:                                              | 50 Road and Rail     | No Limit                                                                                 |

mSv/hr =  
millisievert/hour

(1mSv/hour is  
equal to  
100 mrem/hour)

“Sievert” is the unit of the **International System of Units (SI)**, the modern form of the metric system. It is the only system of measurement with an official status in nearly every country in the world

# For Off-S

- Generator Licenses and/or Permits

## Appendix 3 Generator Licenses and/or Permits


| Generator License and/or Permits |                                                                                                                                             |                                                                                                           |               |                                                                                                                                                                                                |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ship to State                    | Permit                                                                                                                                      | Form                                                                                                      | Duration      | WM-WMS Ensure that:                                                                                                                                                                            |
| Tennessee                        | Radioactive Waste License-for-Delivery                                                                                                      | RHS 8-30                                                                                                  | Yearly        | Permit # on Manifest and permit is current                                                                                                                                                     |
| Utah                             | Generator Site Access Permit (GSAP)                                                                                                         | On-Line:<br><a href="https://secure.utah.gov/gsap/apply.html">https://secure.utah.gov/gsap/apply.html</a> | Yearly        | GSAP # on Manifest and permit is current                                                                                                                                                       |
| Texas                            | Radioactive Material License                                                                                                                | RC Form 252-2                                                                                             | Yearly        | Transporter holds current license                                                                                                                                                              |
| Washington                       | RADIOACTIVE WASTE SHIPMENT CERTIFICATION FOR SHIPMENTS TO THE COMMERCIAL RADIOACTIVE WASTE DISPOSAL FACILITY OR RADIOACTIVE WASTE PROCESSOR | DOH RHF-31D and Perma-Fix Northwest Hazardous Materials Driver's Instructions                             | Each Shipment | DOH RHF-31D is completed and given to the driver.<br><br>Give driver Perma-Fix Northwest Hazardous Materials driver's Instructions and explain State of Washington Port of entry requirements. |

# Processes

- Pre-job briefing

Form 2103

**Integrated Work Document (IWD) Part 3,  
Validation and Work Release**

 **Los Alamos**  
NATIONAL LABORATORY  
EST. 1943

IWD # \_\_\_\_\_ Revision #: \_\_\_\_\_ **Work Release**

By signing below, I verify this activity is compatible with current facility configuration and operating conditions.  
**FOD designated Operations Manager or other facility point-of-contact for work area**

Signature/Z#/Date (If required by FOD): \_\_\_\_\_

*Note: For Standing IWD, release may be given concurrently with signatures on Part 2.*

By signing below, I have verified the following:

- I have verified authorization by ensuring approval signatures of the RLM and FOD.
- I have jointly conducted a validation walkdown with workers to confirm the IWD can be performed as written, and that required initial conditions and other prerequisites are in place.
- The assigned workers are authorized and are competent to perform the work in a safe, secure, and environmentally responsible manner.
- I have conducted the pre-job briefing, and all workers (including support workers) have been briefed.
- I have ensured coordination with any required FOD work-area representatives (e.g., area work coordinators).

**PIC (Signature/Z#/Date) Required:** \_\_\_\_\_



# For Off-S

- Off-Site DOT Compliance Checklist
  - 9 sections

| OFF-SITE DOT COMPLIANCE CHECKLIST                                                                                                                                                                                                                                |                                                                                                                                                                                                                       |                            |    |     |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----|-----|--|
| <b>Waste Type:</b>                                                                                                                                                                                                                                               |                                                                                                                                                                                                                       |                            |    |     |  |
| <b>Destination:</b>                                                                                                                                                                                                                                              |                                                                                                                                                                                                                       | <b>Date Shipped:</b>       |    |     |  |
| Please check the appropriate box and provide requested information.<br><b>DO NOT release vehicle until any discrepancies and/or safety concerns are resolved (as applicable)</b><br>Complete Sections <b>I</b> through <b>VIII</b> prior to release of shipment. |                                                                                                                                                                                                                       |                            |    |     |  |
| Carrier Name:                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                       | DOT ID Number:             |    |     |  |
| EPA ID Number:                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                       |                            |    |     |  |
| MCEP DOT Safety Rating: <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT <input type="checkbox"/> UNRATED                                                                                                                                             |                                                                                                                                                                                                                       |                            |    |     |  |
| MCEP Watch listed? <input type="checkbox"/> YES <input type="checkbox"/> NO If yes, provide information.                                                                                                                                                         |                                                                                                                                                                                                                       |                            |    |     |  |
| DOT Regulated? <input type="checkbox"/> YES <input type="checkbox"/> NO                                                                                                                                                                                          |                                                                                                                                                                                                                       |                            |    |     |  |
| Carrier Transportation security plan: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A                                                                                                                                      |                                                                                                                                                                                                                       |                            |    |     |  |
| Requirement                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                       | Primary Authorized Shipper |    |     |  |
|                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                       | Yes                        | No | N/A |  |
| <b>I. Hazardous Material Category</b>                                                                                                                                                                                                                            |                                                                                                                                                                                                                       |                            |    |     |  |
| 8                                                                                                                                                                                                                                                                | <b>COMPLETE</b> Sections I through VIII of the <i>Off-Site DOT Compliance Checklist</i> (Attachment B), prior to release of the shipment.                                                                             | Primary Authorized Shipper |    |     |  |
| 9                                                                                                                                                                                                                                                                | <b>ENSURE</b> containers in the field are marked, labeled, and prepared for compliant shipment.<br><br><b>Note:</b> The <i>Off-Site Container Checklist</i> and <i>shipping papers</i> are used to perform this step. | WM-WMS Technical Personnel |    |     |  |
|                                                                                                                                                                                                                                                                  | <b>COMPLETE</b> the "Load Verified" column on the Off-Site                                                                                                                                                            | WM-WMS                     |    |     |  |

# For

| Requirement                                                                                                                                                                                                                         | Primary Authorized Shipper |    |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----|-----|
|                                                                                                                                                                                                                                     | Yes                        | No | N/A |
| <b>I. Hazardous Material Category</b>                                                                                                                                                                                               |                            |    |     |
| Do the hazardous materials require either a Hazardous Materials Safety Permit or Hazardous Materials Security Plan?                                                                                                                 |                            |    |     |
| Do the hazardous materials include Type A or Type B Class 7 (radioactive – fissile/non-fissile) materials, or Truckload (TL) quantities of low-level or mixed waste shipped as a low-specific-activity/surface-contaminated object? |                            |    |     |
| Do the hazardous materials require an Environmental Protection Agency (EPA) Uniform Hazardous Waste Manifest?                                                                                                                       |                            |    |     |
| <b>II. Radiological Monitoring:</b>                                                                                                                                                                                                 |                            |    |     |
| Have containers been radiologically surveyed by an RCT?                                                                                                                                                                             |                            |    |     |
| If yes, are results/data included in shipment documentation?                                                                                                                                                                        |                            |    |     |
| <b>III. Commercial Driver License (CDL) Information:</b>                                                                                                                                                                            |                            |    |     |
| Is driver's CDL current (all shipments)?                                                                                                                                                                                            |                            |    |     |
| Is driver DOE badged? (NNSS shipments only)                                                                                                                                                                                         |                            |    |     |
| CDL A _____ B _____ C _____                                                                                                                                                                                                         |                            |    |     |
| CDL appropriate to the waste shipment endorsement?<br><input type="checkbox"/> H- Hazardous Materials <input type="checkbox"/> N-Tanker <input type="checkbox"/> X-Tanker/Hazardous                                                 |                            |    |     |
| CDL classification on File?                                                                                                                                                                                                         |                            |    |     |
| Is a copy of the CDL on file or attached to the manifest file?                                                                                                                                                                      |                            |    |     |
| <b>IV. Medical Examiner's Certificate:</b>                                                                                                                                                                                          |                            |    |     |
| Is the driver's medical examiner's certificate current?                                                                                                                                                                             |                            |    |     |
| Have the driver's restrictions (if any) been verified?                                                                                                                                                                              |                            |    |     |
| Is a copy of the certificate on file or attached to the manifest file?                                                                                                                                                              |                            |    |     |

There are specific qualification requirements to be an Authorized Shipper



Fo

## V. Truck/Truck-tractor Inspection:

Truck Plate State:

Truck Plate Number:

Company vehicle number:

Have truck/truck-tractor wheels been chocked?

Is the transport vehicle's annual inspection current?

Date transport vehicle's annual inspection expires?

## VI. Trailer Inspection:

Trailer plate state:

Trailer plate number:

Company trailer number:

Is the transport trailer's annual inspection current?

Date transport trailer's annual inspection expires?

Does the carrier have proof of financial responsibility?

\$5 million public liability (poison gas, Class 2.3)

\$1 million public liability (all other hazardous materials)

Have hours of service records been maintained?

Have the daily vehicle inspection reports been maintained?

Has the truck/trailer been inspected to ensure good structural condition, free of extraneous debris, and contents are properly documented?

Has the vehicle safety walk around been performed prior to loading?

## VII. Vehicle Safety Equipment Verification:

For non-placarded loads:

Vehicle is equipped with a fire extinguisher with an UL rating of 5 B:C or more?

For placarded loads:

Vehicle is equipped with a fire extinguisher with an UL rating of 10 B:C or more?

### VIII. Before Vehicle is Loaded:

Has the Authorized Shipper visually verified the proper closure of containers and if applicable, checked tightness by hand?

Has the Authorized Shipper ensured that all container (s) markings and labeling are in accordance with applicable US Department of Transportation regulations?

### IX. After Vehicle is Loaded:

Have placards been supplied to the driver and applied to the trailer?

The following placards have been applied:

☐ 2.1 ☐ 2.2 ☐ 2.3 PIH ☐ 3 ☐ 4.1 ☐ 4.2 ☐ 4.3 ☐ 5.1 ☐ 5.2 ☐ 6.1 ☐ 6.1 PIH ☐ 7 ☐

☐ Dangerous ☐ Bulk ☐ Universal Waste Label(s)

Have Polychlorinated Biphenyls (PCBs) been applied to the trailer, if applicable?

For radiological shipments shipped 'Exclusive Use Only'. Have Exclusive Use Instructions been provided to the Driver?

For radiological shipments, have approved route instructions been provided to the Driver?

For radiological shipments to NNSA shipped non-exclusive use, have dedicated service instructions been provided to the Driver?

**Does shipment contain shipments "in transit"? ☐ Yes ☐ No If yes, ensure manifests are included with shipment**

List Manifest Number(s) for All Manifest(s) on Shipment:



# For Off-Site Shipping

RCT \_\_\_\_\_

Printed Name

Z Number

Signature

Date

**Primary  
Authorized Shipper** \_\_\_\_\_

Printed Name

Z Number

Signature

Date

**By signing below, the driver agrees that the blocking and bracing of this load is acceptable and compliant with DOT and Federal Motor Carrier requirements.**

**Driver** \_\_\_\_\_

Printed Name

Z Number

Signature

Date

Driver Contact Number: \_\_\_\_\_

Time Shipment Departed: \_\_\_\_\_

EPC-WMS-FORM-001, R4

Page 2 of 2

11/7/2019

# For Off-Site Shi

- Off-Site Container Checklist

|    |                                                                          |                            |
|----|--------------------------------------------------------------------------|----------------------------|
| 10 | COMPLETE the "Load Verified" column on the Off-Site Container Checklist. | WM-WMS Technical Personnel |
| 11 | COMPLETE the Off-Site Container Checklist.                               | Primary Authorized Shipper |

Prepari  
Waste/

terral Site

Revision: 1

Effective Date: 4/28/2021

Attachment A: Off-Site Container Checklist

## OFF-SITE CONTAINER CHECKLIST

Planned Ship Date:

Hazardous Waste Review (HWR) #(s)

Destination:

Origin:

| WCATS Container ID | Container Size/Type | Manifest # from WCATS | Load Verified | Primary Authorized Shipper | Loaded on Truck |
|--------------------|---------------------|-----------------------|---------------|----------------------------|-----------------|
|                    |                     |                       |               |                            |                 |

Primary Authorized Shipper:

Printed Name

Z#

Signature

Date

WM-WMS Technical Personnel  
or Technician

Printed Name

Z#

Signature

Date

WM-WMS Technical Personnel  
or Technician

Printed Name

Z#

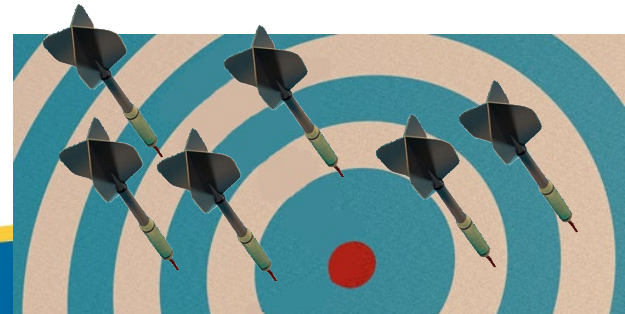
Signature

Date

# Module 9: Enabling Objectives

---

- Recognize DOT authority when shipping waste.
- Identify attributes of shipping waste on-site at LANL.
- Recognize requirements for shipping waste off-site.
- Identify the responsibilities of personnel involved in shipping waste.







# Module 10: Operating Experience/Lessons Learned

Waste Management Fundamentals  
for Environmental Professionals

UTrain: 50448

Revision 0; Aug. 2021



# The Modules

- 1: ~~Intro to Waste~~ ✓
- 2: ~~Waste Regulations and Requirements~~ ✓
- 3: ~~Waste Planning~~ ✓
- 4: ~~Waste Generation and Tracking~~ ✓
- 5: ~~Waste Characterization~~ ✓
- 6: ~~Waste Packaging~~ ✓
- 7: ~~Waste Accumulation and Storage~~ ✓
- 8: ~~Waste Treatment~~ ✓
- 9: ~~Waste Shipping~~ ✓
- 10: **Operating Experience and Lessons Learned**

**YOU  
are  
HERE**

# Topics

---

- Operating Experience and Lessons Learned
- Management Observation and Verification (MOV)
- Issues Management
- Nonconformance Reporting (NCR)
- Recent lessons learned
- SCoR
- Questions/Discussion

# Enabling Objectives

---

- Describe the Management Observation and Verification (MOV) program
- Describe how the Issues Management program is used for waste management activities at LANL
- Describe when an NCR maybe required for a waste package
- Recognize recent lessons learned associated with waste management



**No: PD323**

Revision: 2

Admin. Chg. 2

Issued: 11/01/18

Effective Date: 11/01/18

## LANL Operating Experience Program

### 1.0 PURPOSE

The purpose of this document is to clarify the elements of the program and to define roles and responsibilities for program operation and execution. This document augments the basic lessons learned program expectations defined in [SD320](#), *Los Alamos National Laboratory Contractor Assurance System Description Document*.

The purpose of the LANL Operating Experience Program is to capture and apply lessons taken from operating experiences internal and external to the Laboratory in order to avoid repeat events, anticipate and mitigate undesirable consequences, and replicate best practices. This is accomplished through defined responsibilities for operation of the system used to capture and disseminate operating experience to Laboratory management and through establishment of expectations for managers to evaluate, apply, and share lessons relevant to their and similar operations.


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[About ▾](#)
[Resources](#)
[Reports](#)
[Logout](#)



## LO/TO Inspection Not Done According to Periodic Inspection Requirement



### Most Recent Posts

- Security** Deployed Security: Social Media
- PROGRAMS** LANL Mirror - FY 2020 3rd Quarter Review/Analysis
- LANSC** LO/TO Inspection Not Done According to Periodic Inspection Requirement
- Safety** Safety Share: Tips for Computer Workers to Avoid Eye Strain
- External** When Communications Break Down and Assumptions are Made (PNNL)

### Why We Share Lessons Learned

The goal of the LANL Operating Experience Program is to capture and apply lessons taken from operating experiences internal and external to the Laboratory in order to avoid repeat events, anticipate and mitigate undesirable consequences, and replicate best practices.

[View By DIR/DD/ALD](#)
[View By FOD](#)
[View By Type](#)
[View Pre-Transition](#)

## OPEX★CHAMPIONS

Translating Operating Experience into Action

In this new OPEXatLANL feature, Associate Lab Director Michael Hazen recognizes LANL employees who have contributed to be "OPEX Champions."

# Some Related Terms

- Lessons Learned

## What is a Lessons Learned?

A Lessons Learned is defined by DOE as a good work practice or innovative approach that is captured and shared to promote repeat application or an adverse work practice or experience that is captured and shared to prevent recurrence.

## Why do we have Lessons Learned?

It's a beneficial practice — and it's required. Learning from the mistakes of others is more preferable than dealing with the same problem/incident/situation yourself. Department of Energy Order 210.2A, DOE Security Emergency Preparedness Program (DOE SEC 210.2A) and 16 USC 1491 NNSA Mission Control



# Some Related Terms

---

- Lessons Learned
- Operating Experience

## What is Operating Experience?

Operating Experience is defined by DOE as information that relates to the methods by which work is planned and conducted and an organization's missions are performed. Operating experience provides the basis for knowledge and understanding that fosters development of Lessons Learned and improvement of operational performance.

## What is the purpose of the Laboratory's Operating Experience Program?

The purpose of the LANL Operating Experience Program is to capture and apply lessons taken from operating experiences internal and external to the Laboratory in order to avoid repeat events, anticipate and mitigate undesirable consequences, and replicate best practices. This is accomplished

# Some Related Terms

- *I think of Occurrence Reporting as being a bit broader than Lessons Learned*
- *An Occurrence Report can lead to a Lessons Learned*

- **OCCURRENCES:** Events or conditions that adversely affect, or may adversely affect, DOE's Operating Experience. Operating Experience is defined by DOE as information that relates to the methods by which work is planned and conducted and an organization's missions are performed. Operating experience provides

- Not related, but often confused with the term:

## Occurrence Reporting

- To ensure that the DOE and National Nuclear Security Administration (NNSA) are informed about events that could adversely affect the health and safety of the public or the workers, the environment, DOE missions, or the credibility of the Department.
  - ✓ Complex-wide Notification

# Management Observation and Verification (MOV)

- Purpose of MOVs

## Procedure

Los Alamos National Laboratory

**No: P328-4**

Revision: 7

Admin. Chg. 3

Issued: 05/29/20

Effective Date: 05/29/20

## Management Observation and Verification

### 1.0 PURPOSE

The purpose of this document is to describe the process for performing Management Observations and Verifications (MOV). Managers perform MOVs to implement a systematic process for observing work, spaces, and interacting with workers. Managers are required to perform and document MOVs in accordance with this document.

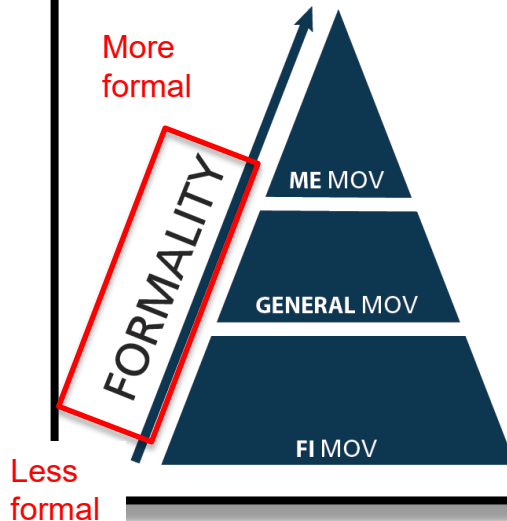
# Management Observation and Verification (MOV)

- Purpose of MOVs
- Three Types of MOVs

*MOVs enable managers to continuously improve their organizations*

*MOVs provide a mechanism to facilitate open and honest communication between managers and workers.*

Each type of MOV is performed with different levels of formality:



LANL uses three types of MOVs:

- 1 **MONITORED EVOLUTIONS (ME)** - watch, listen and record actions; monitor without coaching/correction; review results with workers.
- 2 **STANDARD** - observe work activities and spaces; listen attentively and actively; learn best practices; look for opportunities to improve.
- 3 **FIELD INTERACTIONS (FI)** - active interaction with workers by questioning, providing feedback and confirmation, coaching and assessing, correcting where needed, and recognize accomplishments and successes

- The purpose of performing MOVs is to enable managers to continuously improve their organizations.
- Through MOVs, managers observe workers and the workplace, and verify completion of corrective actions.
- Managers should encourage workers to perform and document MOVs.
- Associate Directors determine the number and frequency of MOVs performed in their Directorates and regularly monitor results for effectiveness and trends.
- Managers engage their personnel, observe work, ensure that workers have the needed skills and resources, and identify ideas or solutions to barriers to work performance.
- MOVs may be performed to verify actions were completed that were generated from past MOVs or from other sources. The verification process may provide data that can be used to validate and monitor change in organizations.
- **All managers are required to perform and document MOVs.**

<http://int.lanl.gov/organization/performance/tools/tools.php>

# Issues Management

**Issues Management:** The Laboratory's issues management (IM) process enables Laboratory management to formally intervene and effectively manage and correct the underlying causes of abnormal events, noncompliances, negative trends, and other issues. The IM process has five basic components: (1) *identify* an issue, which includes determining appropriate line management ownership and risk characterization; (2) *analyze* the issue and integrate the risk level with causal analyses and extent of condition evaluations; (3) *mitigate* the issue by developing, implementing, and tracking of corrective actions; (4) *evaluate* if the issue is resolved by reviewing completion and effectiveness of corrective actions; and (5) *communicate* issue resolution by developing and distributing lessons learned. The Laboratory uses the IM tool to document and manage issues and associated corrective actions. DOE/NNSA has access to the IM tool and issues resolution data. Additional information on the IM process is available in [P322-4, Issues Management](#).

LANL

SD320, Rev. 7

Effective Date: 04/02/20

Issues management allows for “closing the loop”



# Nonconformance Reporting (NCR)

- P330-6; Nonconformance Control and Reporting

**Conditional Release Hold Tag**  
Unauthorized Removal May  
Constitute A Safety Violation  
Tag Number \_\_\_\_\_ of \_\_\_\_\_ tags issued.  
NCR No. \_\_\_\_\_  
Item(s) to which this tag is affixed: \_\_\_\_\_  
**CAUTION**  
The item or component to which this tag is affixed is subject to a nonconforming  
condition. Specific controls associated with the use of this item are as follows: \_\_\_\_\_  
Posting Authorized by Owning Manager: \_\_\_\_\_  
Owning Manager: \_\_\_\_\_ Date: \_\_\_\_\_ Phone: \_\_\_\_\_  
Tag Posted By: \_\_\_\_\_  
Name: \_\_\_\_\_ Date: \_\_\_\_\_ Phone: \_\_\_\_\_  
CR Expiration Date: \_\_\_\_\_

**NCR Hold Tag**  
Unauthorized Removal May  
Constitute A Safety Violation  
Tag Number \_\_\_\_\_ of \_\_\_\_\_ tags issued.  
NCR No. \_\_\_\_\_  
Item(s) to which this tag is affixed: \_\_\_\_\_  
**CAUTION**  
The item or component to which this tag is affixed is subject to a nonconforming  
condition. \_\_\_\_\_  
Posting Authorized by Owning Manager: \_\_\_\_\_  
Owning Manager: \_\_\_\_\_ Date: \_\_\_\_\_ Phone: \_\_\_\_\_  
Tag Posted By: \_\_\_\_\_  
Name: \_\_\_\_\_ Date: \_\_\_\_\_ Phone: \_\_\_\_\_

**LANL**

P330-6, Rev. 14

Effective Date: 08/18/2020

An NCR should be written for any non-conforming waste that is identified outside of the normal waste review process.

*Nonconformance Control and Reporting*

Rev. 14

## Nonconformance Control and Reporting

### 1.0 PURPOSE

This document establishes the process for identifying, controlling, reporting, evaluating, and dispositioning nonconforming items to prevent their inadvertent installation, use, or shipment.

### 2.0 AUTHORITY AND APPLICABILITY

Identify

Initiate NCR

Control the  
Item

Evaluate  
and  
Investigate

Disposition

Close NCR



# Identifying Waste-related Trends

- It is difficult to identify trends in waste-related issues because “waste” is not a searchable category for Lessons Learned or Issues Management databases.
  - So, “waste” must be clearly identified in the title and list of keywords to enable effective searching and trending

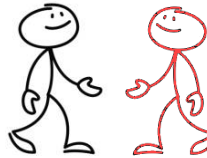


# Some things we've learned...

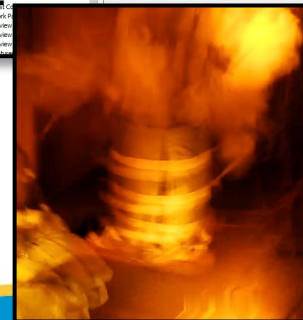
- Bar codes and other labels fade/degrade
- Lack of WCATS inventory
- Roles and Responsibilities
- Communication
- WCATS is complex
- Some issues take a long time to appear.
- Chemical compatibility issues
- ... And more...



Hmmmm,  
WCATS says  
we have 10  
drums here...



| 450338                     | HAZ | 03 | 000022 | Pending | No Expiration Date |
|----------------------------|-----|----|--------|---------|--------------------|
| <b>General Information</b> |     |    |        |         |                    |
| Waste Stream Location      |     |    |        |         |                    |
| Building:                  |     |    |        |         |                    |
| Room:                      |     |    |        |         |                    |
| Generating Group           |     |    |        |         |                    |
| Area Type:                 |     |    |        |         |                    |
| Waste Accumulation         |     |    |        |         |                    |
| Site No:                   |     |    |        |         |                    |
| ER Site                    |     |    |        |         |                    |
| SVN/AOC No:                |     |    |        |         |                    |



# SCoR

- On a related note...

- LANL employees follow the eight Safe Conduct of Research (SCoR) principles
- Despite its name, **SCoR doesn't pertain only to safety or only to people conducting research**. The eight principles can help all of us do our work more effectively.
- Employees across LANL are encouraged to apply the principles in creative and practical ways. Director Thom Mason gave each employee a SCoR badge card that can be attached to a lanyard as a constant reminder of what SCoR means.
- Created by Battelle, SCoR has a proven track record at seven other labs — it works! Like all Battelle-managed labs, we are embracing SCoR to learn from our challenges, reduce accidents and injuries, unnecessary risks, and distractions.



# SCoR Principles

- Everyone is personally responsible for ensuring safe operations
- Leaders value the safety legacy they create in their discipline
- Staff raise safety concerns because trust permeates the organization
- Cutting-edge science requires cutting-edge safety
- A questioning attitude is cultivated
- Learning never stops
- Hazards are identified and evaluated for every task, every time
- A healthy respect is maintained for what can go wrong

**The eight  
SCoR  
Principles**

# Module 10: Summary

---

- High-level summary of what was presented:
  - Operating Experience and Lessons Learned
  - Management Observation and Verification (MOV)
  - Issues Management
  - Nonconformance Reporting (NCR)
  - Recent lessons learned
  - SCoR
  - Questions/Discussion

*In conclusion...*

# Module 10: Enabling Objectives

---

- Describe the Management Observation and Verification (MOV) program
- Describe how the Issues Management program is used for waste management activities at LANL
- Describe when an NCR maybe required for a waste package
- Recognize recent lessons learned associated with waste management

